EVERYMAN'S ENCYCLOPAEDIA

IN TWELVE VOLUMES

VOLUME ONE

A—BADGER

EVERYMAN'S ENCYCLOPAEDIA

VOLUME ONE

NEW AND REVISED EDITION



LONDON AND TORONTO
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PREFACE

It is nearly twenty years since the first edition of this *Encyclopaedia* was published—years more crowded with events, more significant with change than any in history. That first edition was issued to meet the needs of every man—the general reader, the man in the street—whoever might wish to obtain information rapidly on subjects met with in the course of general reading or in everyday life. Twenty years ago the editors were able to assure their readers that no subject of importance, no man or woman of outstanding reputation, had been left out. Moreover, the scientific articles in that first issue were up to date, and intelligible to the layman without being flimsy or inaccurate.

The world has changed since then. Civilisation has changed, and the world's thought with it. The tremendous impact of the Great War on human institutions, and the events of the War itself, have rendered the pre-war Encyclopaedia more or less obsolete. The remarkable impetus which the war gave to science, as shown in the wonders of aviation, radio-telegraphy, and chemistry, has convinced us that there are no limits to what science may achieve. The map of Europe has been remade; historic frontiers have disappeared; constitutional changes have profoundly modified old and almost feudal conceptions of government. New nations, new republics, new kingdoms, new political aspirations and new theories—or old theories masquerading in

To gain space certain well-known abbreviations have been used, but used sparingly. A list is prefixed to every volume. Bibliographies have been added wherever it has seemed likely that readers might require fuller and wider information; but obscure references have been avoided. The number of illustrations has been greatly increased in this edition.

ATHELSTAN RIDGWAY.

March 1931.

LIST OF ABBREVIATIONS

(*See also article on* ABBREVIATIONS.)

ac., acres.
A.D., after Christ.
agric., agricultural.
ambas., ambassador.
ann., annual.
arron., arrondissement.
A.-S., Anglo-Saxon.
A.V., Authorised Version.
b., born.
B.C., before Christ.
Biog. Dict., Biographical Dictionary.
bor., borough.
bp., birthplace.
C., Centigrade.
c. (*circa*), about.
cap., capital.
cf., compare.
co., county.
com., commune.
cub. ft., cubic feet.
d., died.
Dan., Danish.
dept., department.
dist., district.
div., division.
E., east; eastern.
eccles., ecclesiastical.
ed., edition; edited.
e.g., for example.
Ency. Brit., Encyclopædia Britannica.
Eng., English.
estab., established.
et seq., and the following.
F., Fahrenheit.
fl., flourished.
fort. tn., fortified town.
Fr., French.
ft., feet.
Ger., German.
Gk., Greek.
gov., government.
Heb., Hebrew.
Hist., History.
i.e., that is.
in., inches.
inhab., inhabitants.
Is., island, -s.
It., Italian.
jour., journal.
Lat., Latin.
lat., latitude.
l. b., left bank.
long., longitude.
m., miles.
manuf., manufacture.
mrkt. tn., market town.
Mt., mts., mount, mountain, -s.
N., north; northern.
N.T., New Testament.
O.T., Old Testament.
par., parish.
parl., parliamentary.
pop., population.
prin., principal.
prov., province.
pub., published.
q.v., which see.
R., riv., river.
r. b., right bank.
Rom., Roman.
R.V., Revised Version.
S., south; southern.
sev., several.
Sp., Spanish.
sp. gr., specific gravity.
sq. m., square miles.
temp., temperature.
ter., territory.
tn., town.
trans., translated.
trib., tributary.
U.S.A., United States of America.
vil., village.
vol., volume.
W., west; western.
yds., yards.

A—BADGER

THE ENCYCLOPAEDIA

A

A is the first letter in the English alphabet, as in all the Greek and Latin alphabets. It is derived through the Latin from the Greek *alpha*, which in its turn was copied from the Phœnician *aleph*. This was taken, it is generally thought, from the hieroglyphic eagle, which was called *ahom*, and expressed the aspirate sound now represented by the first *a* in *aboard*. The Phœnicians called it *aleph*, as they thought it resembled the head of an ox, and it would seem that the Greeks borrowed this sound from the Phœnicians in their *alpha*, for this word in Greek has no known signification. We still retain in our capital A the Greek and Roman Lapidary form which bears some resemblance to the Phœnician: the Greek and Latin uncial is ᴀ, from which we have taken our Italic and Script *a*; from this, too, was taken the Greek minuscule *α*. The Caroline minuscule, used principally in printed matter, was copied from this; but to avoid confusion with *d*, its stroke was bent back so as to take the form a; this is now generally used in what is called Roman type. The next form is the Black-letter a, which is an amplification of the Caroline a.

The sound of this letter in the Semitic alphabets was that of a guttural breathing, and, strange to say, this sound is perhaps the most commonly represented by our own A, as in *aboard*, *aground*, etc. The Greeks adopted the symbol to represent what is now the general continental pronunciation of A, but which is rather rare in English: this is the purest and simplest vowel sound, and is uttered by opening the air passage to its fullest extent, as in *father*. It is regarded as the primitive vowel sound. The third sound represented by A is that in the word *call*; this sound should really be represented by *au*, and is influenced by the double consonant at the end of the word in which it occurs. The modified pronunciation of A, as in the word *fame*, is partly due to the mute vowel *e* at the end of the word. Again, in words like *care*, *pare*, *rare*, A represents a sound which might be more accurately represented by the diphthong *ai*. Finally, we come to the short A as in *cat*, which is the most common in the conversation of educated people. These sounds are modified in the various dialects of the country.

The letter A is the most easily pronounced of the vowels, requiring neither the retraction of the lips like *i* (= *ee* in *feel*), nor their propulsion as in *u* (= *oo*).

A is readily interchanged with O, as in the German and English *kalt*, *cold*. It is interchanged also with E. Thus the Romans generally substituted an A where we now find E in German names, as *Albis* for *Elbe*; *Amisia* for *Ems*. A is interchanged with I, as in the Greek *ἄν* and the Latin *in*, and in the Latin *sine* and the French *sans*.

A (in music), *see* DIATONIC, GAMUT; SCALE.

A or An, the indef. art., *a* being used before a consonant, *an* before a vowel; as *a king*, *an emperor*. Sometimes a virtual consonant exists at the beginning of a word without being written, as in *union* and *once*; before these words it is customary to drop the final letter of the article in conversation and writing. When an *h* is mute, however, we should retain the *n* in writing and speaking: thus, *a history*, but *an historical work*. That *an* and not *a* was the original form is proved by the Anglo-Saxon *an* and the German *ein*; indeed our numeral one is nothing but a form of it, cf. *three shillings a pound*. The double form of our article has caused certain words to be wrongly written, as *a neft* for *an eft*. The letter *a* often appears prefixed to a word, as in *aside*, *afoot*, *aboard*, *nowadays*, etc.; these are derived from *on syde*, *on fote*, *on borde*, *now-on-daies*, all of which forms are found in our old English poets; this *on* is an Anglo Saxon preposition meaning *in*. In many places *a* now takes the place of *on*, as 'he fell asleep,' which in an old version of the N.T. was 'he fell on sleep.' The *a* formerly prefixed to our participles in *ing*, both in the active and passive sense, as 'the house is a-preparing,' 'he is gone a-walking,' has the same origin.

Aa, the name of several small

rivs.—five in Germany, five in Switzerland, three in Flanders, one in Russia, and one in France. The Fr. one is in the Pas-de-Calais dept.

Aach, a small riv. and tn. in the grand duchy of Baden. The tn. is situated near the source of the river.

Aachen, the Ger. name for Aix-la-Chapelle (*q.v.*).

Aalborg, in N. Jutland, on the S. side of Liimfiord, is a cathedral tn. and the seat of a bishopric. It exports cattle, hides, wool, dairy produce; imports coal, salt, petroleum, and grain; Brit. vice-con.; pop. 42,820.

Aalborg Amt, the most N. div. of Jutland.

Aalen, a tn. on the Kocher, near Stuttgart in Würtemberg, Germany; manufs. iron and woollen goods; pop. 12,180.

Aalesund, a tn. in Romsdal, Norway; a great port for cod-fishing; burnt down in 1904, but rebuilt since; bp. of Rollo; pop. 16,410.

Aali Pasha (1815–71), a Turkish statesman. At the Congress of Paris he represented Turkey, and maintained its rights with great skill. He helped to put down the Cretan Rebellion (1867–8) and subdued the Khedive of Egypt (1869). From 1861 to his death he shared with Fuad Pasha the post of vizier.

Aalst, *see* ALOST.

Aalten, a vil. Gelderland, Holland; pop. 7500.

Aamot, a tn. Hedemarken, Norway, noted for textiles; pop. 3500.

Aar, a trib. of the Rhine; rises in the Grimsel in Switzerland and flows through Lakes Brienz and Thun, joining the Rhine near Waldshut. On its banks are Meiringen, Interlaken, Thun, Berne, Aarlerg, Soleure, Aarburg, Aarau, and Brügg. It has sev. tribs. among which are the Reuss and the Limmat. It is 170 m. long.

Aarau, cap. of Aargau, Switzerland, on the Aar, 40 m. N.E. of Berne; manufs. silk, leather, cotton goods, mathematical instruments; pop. 29,510. Here met the Assembly of the Diet of the Cantons, 1798, and proclaimed the Swiss Republic.

Aard-vark, the (Cape ant-bear), is an animal closely related to the great ant-eater. It has large pointed ears, apering snout and tail, stumpy egs, a long slimy tongue, and little air on its body. Its name (Aard-ark) is the Dutch for 'earth-pig,' a ery appropriate one, as it resembles he pig in its burrowing and grubbing, r which its sharp snout is of great e. Its hams are esteemed as good those of a pig. When fully grown is about 5 ft. long. During the nt of the day it lies in its burrow. is the only ant-eater possessing teeth, having seven molars on e side above and six below. It is v



THE AARD-VARK

timid, and if pursued burrows very rapidly: it can be killed by a smart blow on the snout. *See* ANT-EATER.

Aard-wolf, the (*Proteles Lalandii*), is an animal 3 ft. 6 in. in length, of a yellowish-grey colour, with heavy dark stripes and a long bushy tail. It resembles a young hyæna; it has peculiar teeth: the first three above are false and the fourth is small: it has no cutting teeth. As its name indicates, it is a burrowing animal, of nocturnal habits and timid disposition; it is like the hyæna in its taste for carrion and termites, which it digs up with its sharp claws.

Aarestrup, Emil (1800–56), a Danish poet, *b.* at Copenhagen. He pub. *Efterladte Digte* in 1838, which made some stir, but it was not till after his death, when Brandes edited his *Samlede Digte* (1877), that he became known throughout Denmark as one of the greatest lyric poets.

Aargau, or Argovie, a canton of Switzerland, taking its name from the Aar, which flows through it. It is bounded on the N. by the Rhine; on the S. by the canton of Lucerne. Area about 550 sq. m. Became democratic after the war of the Sunderbund in 1841. In the fertile parts the people are engaged in agriculture, dairy farming, and cattle-breeding. Prin. t… Aarau (cap.), Baden, Brügg, Lauf… burg, Lenzburg. Pop. 240,750; t… majority are Protestants.

Aarhus, second port in Denmar… has a good harbour, improved 188… 90; exports grain, flour, dairy pr… duce, oysters, and tallow; impor… coal, timber, wine, sugar, tobacc… and manufactured goods; it has lon… been the seat of a bishop and has … large cathedral; pop. 76,230.

Aarhus Amt, a div. in the E. o… Jutland; cap. Aarhus; pop. 105,000.

Aaron (Heb. 'Aharōn), brother of Moses, three years his senior. He seems to have acquired some influence with his tribe, the Levites, and by divine suggestion he came to meet Moses and assembled the elders to confer with him (Ex. iv.). He be-

came the associate and spokesman of his brother in their interviews with Pharaoh (Ex. iv.). The priesthood was fixed in his line (Ex. xxviii.). While Moses was on the mt. A. was intimidated into making the golden calf (Ex. xxxii.). Notwithstanding this A. was not deprived of the priesthood. He was consecrated high priest (Lev. viii.), and his consecration was ratified by the budding of his rod, while the rods representing the other tribes remained unchanged (Num. xvii.). He married Elisheba and had four sons.

Aaron's beard, the common name for *S. sarmentosa* of the order Saxifragaceæ. It is a well-known Chinese plant usually grown in a hanging basket. It is also applied to the *Hypericum calycinum*, the large-flowered St. John's wort.

Aarsens, Frans van (1572-1641), Dutch diplomatist. Ambas. to France, England, Venice; enemy of Barneveldt.

Aasen, Ivar (1813-96), *b.* in Romsdal, Norway; self-educated; studied the Norwegian dialects, in which he was regarded as the greatest authority. Attempted to construct a composite language; pub. a grammar and dictionary (*Norsk Grammatik*, 1864, and *Norsk Ordbog*, 1873). In this language he wrote plays and poems.

Ab, the eleventh month of the Jewish civil year, corresponding to a part of July and a part of Aug.; it does not occur in the A.V. of the Bible, but is often found in the Talmud.

Ababde, a vil. of Middle Egypt, on the Nile, near which are found ruins of Antinoë, a city built by Hadrian and named after Antinous, and also ruins of Besa.

Ababde, a nomad tribe of Hamitic people, partly of Arabian descent, who swell between the Nile and the Red Sea. They are hospitable and honest, but at times treacherous; they travel extensively. Their homes are huts and caves, and their speech is usually Arabic. They possess herds of sheep and goats, the camel is their beast of burden, and they trade in gum and senna. In number they are nearly 40,000.

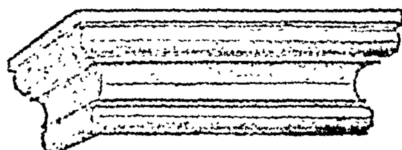
Abaca, the Philippine name for *Musa textilis*, yielding fibre for ropes and cordage; cultivated in the Philippines, whence exported now to the value of £2,500,000; resembles the banana in growth. *See* HEMP, MANILLA, BANANA, FIBRE.

Abacænum, anct. tn. of the Siculi in Sicily, W. of Messina and S. of Tyndaris.

Abaco, *see* BAHAMAS.

Abaculus, a small tile of glass or marble used in mosaic work.

Abacus, instrument used for aiding calculation; the name may be given to any machine for counting with beads, etc., in which one row stands for units, another for tens, etc. In



New Romney, Kent
(*Norman*)



Oxford Cathedral Chapter House
(*Early English*)



Merton College Chapel
(*Decorated*)



Henry VII Chapel, Westminster
(*Perpendicular*)

ABACUS (Architecture)

England it is only used nowadays in infant schools, to teach children to count. Used by Romans and still used in parts of Russia, China, and Persia. Also: 1, in architecture a flat stone at the top of a column; 2, a dice board; 3, a mathematician's table covered with sand on which figures were drawn; 4, a counting board; 5, a sideboard.

Abaddon, the name given to the king of the mystical army of locusts (Rev. ix.), the 'angel of the bottomless pit.' The Gk. equivalent is Apollyon. The Heb. term occurs thrice in Job, twice in Proverbs, and once in Psalms, rendered by 'destruction.' It is thrice associated with 'Sheol,' and once with 'Death.'

Abadeh, a tn. Persia, halfway between Ispahan and Shiraz, noted for wood-carving and fruit; pop. 10,000.

Abaissé, *see* HERALDRY.

Abakansk, a tn. on the Yenisei, in the S. of Siberia, noted for coal mines; pop. 1200.

Abalone, or ear-shell, a shell-fish of the family Haliotidæ, found chiefly on Californian coasts, and largely used for food.

Abana or **Amana** one of 'the rivs. of Damascus' (2 Kings v.), now *el-Barada*, the Gk. *Chrisorrhoas*.

Abancay, cap. of Apurimac, Peru, near Cuzco, noted for sugar; pop. 6000.

Abancourt, Charles Xavier Joseph d' (1759–92), *b.* at Douay; supporter of Louis XVI.; minister during the Revolution; in 1792 appointed Minister of War; declared an enemy to freedom, and murdered at Versailles by the mob, Sept. 9, 1792.

Abandonment, *see* PARENT AND CHILD, HUSBAND AND WIFE, DERELICT, SALVAGE, INSURANCE, MARINE, NOLLE PROSEQUI, DOMICILE.

Abanilla, a tn. Murcia, Spain; pop. 6800.

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Abano Bagni, a vil. near Padua, in Italy. Rom. name Aponus, and the Fons Aponi were famous; bp. of Pietro di Abano; pop. 4600.

Abantes, anct. inhab. of Eubœa; said to have been of Thracian origin, to have first settled in Phocis, where they built Abæ and afterwards crossed to Eubœa; they assisted in colonising sev. of the Ionic cities of Asia Minor.

Abanto y Ciervana, a tn. in the prov. of Vizcaya, Spain, containing rich iron mines; pop. 7000.

Abarbanel (Abravanel, Abarbenel), Isaac Ben Jehudah (1437–1508), Jewish statesman and author; *b.* at Lisbon of an anct. Jewish family. Distinguished for his learning and wealth; minister of state to King Alfonso V. of Portugal. Suspected of treason by John II. and had to escape. Served Ferdinand, King of Aragon, until the expulsion of Jews from Spain, 1492. Lived thenceforward in Naples and Venice, where he died, 1508. Wrote commentaries on the O.T. and the expected Messiah. His first son, Leo Hebræus (Juda Leon), a doctor and philosopher, wrote *Dialoghi di Amore* (1535); his second son, Joseph, was a doctor at Venice and Ferrara, and the third son, Samuel, a statesman.

Abarim, 'the parts beyond,' *i.e.* beyond Jordan, referring to a range of mts. E. of Jordan as seen from the W.

Abaris, legendary hyperborean priest of Apollo; came from near Caucasus to Greece during a plague; said to have taken no earthly food, and to have ridden on an arrow, the gift of Apollo, through the air. *See* Herodotus, iv. cap. 36.

Abas, 1. Son of Metanira; changed by Demeter into a lizard because he mocked the goddess when drinking to quench her thirst in his mother's house, where she had come on her wanderings. *See* Ovid, *Metam.* v. 451–461.

2. 12th King of Argos; grandson of Danaus and father of Acrisius and Prœtus; received as a reward the shield of Danaus, which had the power of reducing a revolted people to submission.

Abatement, derived from O.Fr. word *abater*, to prostrate or destroy.

1. In a literal sense to destroy, as to abate a nuisance. *See* NUISANCE.

2. The statement of some cause or impediment why a civil action should be abandoned. In this case if the abator has taken advantage of a flaw he must at the same time show how it may be amended. In law As. do not, as formerly, take place on the death, marriage, or bankruptcy of one of the persons concerned, nor in the case of wrong Christian names being given, or some mistake being made in the description of the calling of one of the parties concerned. Misnomer is now the only case in which a plea in A. to an indictment has been usual in practice. Pleas in A. to criminal indictment are no longer allowed.

3. It is 'an A. when a man dies seised of an estate or inheritance and, between the death and the entry of the heir, a stranger doth interpose himself and abate' (Co. Litt. 277*a*). The true owner can only recover the seisin by entry; and if the abator dies seised, the land will descend to his heir, but the right of entry or action of the true owner will still

subsist (3 & 4 Wm. IV., c. 27, s. 29). *See* LEGACY.

4. Heraldry. A mark of dishonour on a coat of arms for some stain in the character of the wearer. The only A. now used is the *baston*, to indicate bastardy.

Abati (or Abatti or Abbato), Niccolo (1512–71), *b.* at Modena; executed in fresco under Primaticcio (*q.v.*) 'The Adventures of Ulysses' in the palace at Fontainebleau; originals destroyed, but prints were pub. by Van Thulden in Paris, 1630. His best known easel-work, 'The Martyrdom of St. Peter and St. Paul,' painted on wood for the church of the Benedictines at Modena (1546), is now in the gallery at Dresden. Between the years 1546 and 1552 he lived at Bologna, where he painted and worked in fresco. After this he accompanied Primaticcio to France, where he died at Paris (1571). He has been compared with Titian and Raphael. His brother Pietro Paolo was a clever horse and battle painter. His son Giulio Camillo, his grandson Ercole, and his great-grandson Pietro Paolo were all great painters; Ercolo, *b.* at Modena, 1563, *d.* 1613, executed with B. Schidone frescoes of the Council hall of Modena.

Abatis or Abattis, in military art a number of felled trees with smaller branches cut off, and placed side by side with their butt ends towards the defenders, and secured to the ground by forked pickets; serves as an obstacle to the advance of an enemy.

Abattoir, the name given to the public slaughter-houses estab. in Paris by a decree of Napoleon, finished 1818; first estab. in Gt. Britain at Edinburgh, 1851; Islington, 1855; now in all tns. where many cattle are slaughtered: under careful inspection to prevent the sale of unwholesome meat. The site should be outside the city, within easy access of the cattle market; the floors and walls to a certain height should be tiled to prevent absorption; all woodwork should be avoided, and proper accommodation for killing, dressing, and cooling should be provided; the offal should be destroyed or removed immediately; this can be used for manure; there should be a separate chamber for the preparing of the feet and intestines. The largest cattle and hog killing centre in the world is Chicago (*q.v.*). *See also under* ADULTERATION.

Abauzit, Firmin (1679–1767), *b.* at Uzès in Languedoc, of Protestant parents. After the revocation of the Edict of Nantes, 1685, he escaped with his brother by his mother's aid and went to Geneva; his mother was imprisoned for two years, but she escaped and joined her sons; Firmin made progress in every branch of human study. In 1698 he visited Germany, Holland, France, and England, where he attracted the attention of such men as Newton and Bayle. King William tried to persuade him to remain in England, but his affection for his mother made him return to Geneva. He was greatly esteemed by his fellow-citizens and foreigners; he helped in the Fr. translation of the N.T., which appeared in 1726. Three years before he was offered a professor's chair by the academy, but he declined, preferring the post of supernumerary librarian without salary. He wrote a number of theological works, some of which were destroyed by his heirs owing to a difference in religious opinions (he was a Unitarian). He was remarkable for an extraordinary power of memory.

Abb, *see* EBBA.

Abba (Aramaic for father), a word occurring three times in the N.T. (Mark xiv. 36; Rom. viii. 15; Gal. iv. 6), always with its translation subjoined. In the Syriac, Coptic, and Ethiopic Churches the title came to be applied to the bishops.

Abbadie, Antoine Thompson d' (1810–97), *b.* at Dublin, educated in France; 1835 sent on a mission to Brazil by the Académie des Sciences; 1837–48 explored Abyssinia; 1867 made a member of above academy; 1882 went to St. Domingo to see the passage of Venus across the sun. Prin. work is *Géodésie de la haute Ethiopie* (Paris, 1873). His brother, Arnaud-Michel (1815–93), *b.* at Dublin; travelled with him. His prin. work is *Douze Ans dans la haute Ethiopie* (Paris, 1868), a record of the travels and observations of both.

Abbadie, Jacques (1654–1727), *b.* at Nay 1654 and educated at Puylaurens, Saumur, and Sedan, where he graduated D.D. In 1680 he was appointed pastor of a Fr. Protestant church in Berlin by Frederick William, Elector of Brandenburg. Between the years 1688 and 1689 he accompanied Marshal Schomberg to Holland, England, and Ireland, and was made pastor of the Fr. church in the Savoy. In 1699 he was made Dean of Killaloe by William III. He died at Marylebone, London, in 1727. His chief works are *Traité de la Vérité de la Religion Chrétienne*, 1684; *Traité de la Divinité de Nôtre Seigneur Jésus Christ*, 1689; *L'Art de se connaître soi-même*, 1692; *Défense de la Nation Britannique*, 1692—a vindication of the revolution of 1688; *La Grande Conspiration d'Angleterre*, 1696, written by the order of William III.

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Abanto y Ciervana, a tn. in the prov. of Vizcaya, Spain, containing rich iron mines; pop. 7000.

Abarbanel (**Abravanel**, **Abarbenel**), **Isaac Ben Jehudah** (1437–1508), Jewish statesman and author; *b.* at Lisbon of an anct. Jewish family. Distinguished for his learning and wealth; minister of state to King Alfonso V. of Portugal. Suspected of treason by John II. and had to escape. Served Ferdinand, King of Aragon, until the expulsion of Jews from Spain, 1492. Lived thenceforward in Naples and Venice, where he died, 1508. Wrote commentaries on the O.T. and the expected Messiah. His first son, Leo Hebræus (Juda Leon), a doctor and philosopher, wrote *Dialoghi di Amore* (1535); his second son, Joseph, was a doctor at Venice and Ferrara, and the third son, Samuel, a statesman.

Abarim, 'the parts beyond,' *i.e.* beyond Jordan, referring to a range of mts. E. of Jordan as seen from the W.

Abaris, legendary hyperborean priest of Apollo; came from near Caucasus to Greece during a plague; said to have taken no earthly food, and to have ridden on an arrow, the gift of Apollo, through the air. *See* Herodotus, iv. cap. 36.

Abas, 1. Son of Metanira; changed by Demeter into a lizard because he mocked the goddess when drinking to quench her thirst in his mother's house, where she had come on her wanderings. *See* Ovid, *Metam.* v. 451–461.

2. 12th King of Argos; grandson of Danaus and father of Acrisius and Prœtus; received as a reward the shield of Danaus, which had the power of reducing a revolted people to submission.

Abatement, derived from O.Fr. word *abater*, to prostrate or destroy

1. In a literal sense to destroy, as to abate a nuisance. *See* NUISANCE.

2. The statement of some cause or impediment why a civil action should be abandoned. In this case if the abator has taken advantage of a flaw he must at the same time show how it may be amended. In law As. do not, as formerly, take place on the death, marriage, or bankruptcy of one of the persons concerned, nor in the case of wrong Christian names being given, or some mistake being made in the description of the calling of one of the parties concerned. Misnomer is now the only case in which a plea in A. to an indictment has been usual in practice. Pleas in A. to criminal indictment are no longer allowed.

3. It is 'an A. when a man dies seised of an estate or inheritance and, between the death and the entry of the heir, a stranger doth interpose himself and abate' (Co. Litt. 277*a*). The true owner can only recover the seisin by entry; and if the abator dies seised, the land will descend to his heir, but the right of entry or action of the true owner will still

subsist (3 & 4 Wm. IV., c. 27, s. 29). *See* LEGACY.

4. Heraldry. A mark of dishonour on a coat of arms for some stain in the character of the wearer. The only A. now used is the *baston*, to indicate bastardy.

Abati (or Abatti or Abbate), Niccolo (1512–71), *b.* at Modena; executed in fresco under Primaticcio (*q.v.*) 'The Adventures of Ulysses' in the palace at Fontainebleau; originals destroyed, but prints were pub. by Van Thulden in Paris, 1630. His best known easel-work, 'The Martyrdom of St. Peter and St. Paul,' painted on wood for the church of the Benedictines at Modena (1546), is now in the gallery at Dresden. Between the years 1546 and 1552 he lived at Bologna, where he painted and worked in fresco. After this he accompanied Primaticcio to France, where he died at Paris (1571). He has been compared with Titian and Raphael. His brother Pietro Paolo was a clever horse and battle painter. His son Giulio Camillo, his grandson Ercole, and his great-grandson Pietro Paolo were all great painters; Ercole, *b.* at Modena, 1563, *d.* 1613, executed with B. Schidone frescoes of the Council hall of Modena.

Abatis or Abattis, in military art a number of felled trees with smaller branches cut off, and placed side by side with their butt ends towards the defenders, and secured to the ground by forked pickets; serves as an obstacle to the advance of an enemy.

Abattoir, the name given to the public slaughter-houses estab. in Paris by a decree of Napoleon, finished 1818; first estab. in Gt. Britain at Edinburgh, 1851; Islington, 1855; now in all tns. where many cattle are slaughtered: under careful inspection to prevent the sale of unwholesome meat. The site should be outside the city, within easy access of the cattle market; the floors and walls to a certain height should be tiled to prevent absorption; all woodwork should be avoided, and proper accommodation for killing, dressing, and cooling should be provided; the offal should be destroyed or removed immediately; this can be used for manure; there should be a separate chamber for the preparing of the feet and intestines. The largest cattle and hog killing centre in the world is Chicago (*q.v.*). *See also under* ADULTERATION.

Abauzit, Firmin (1679–1767), *b.* at Uzès in Languedoc, of Protestant parents. After the revocation of the Edict of Nantes, 1685, he escaped with his brother by his mother's aid and went to Geneva; his mother was imprisoned for two years, but she escaped and joined her sons; Firmin made progress in every branch of human study. In 1698 he visited Germany, Holland, France, and England, where he attracted the attention of such men as Newton and Bayle. King William tried to persuade him to remain in England, but his affection for his mother made him return to Geneva. He was greatly esteemed by his fellow-citizens and foreigners; he helped in the Fr. translation of the N.T., which appeared in 1726. Three years before he was offered a professor's chair by the academy, but he declined, preferring the post of supernumerary librarian without salary. He wrote a number of theological works, some of which were destroyed by his heirs owing to a difference in religious opinions (he was a Unitarian). He was remarkable for an extraordinary power of memory.

Abb, *see* EBBA.

Abba (Aramaic for father), a word occurring three times in the N.T. (Mark xiv. 36; Rom. viii. 15; Gal. iv. 6), always with its translation subjoined. In the Syriac, Coptic, and Ethiopic Churches the title came to be applied to the bishops.

Abbadie, Antoine Thompson d' (1810–97), *b.* at Dublin, educated in France; 1835 sent on a mission to Brazil by the Académie des Sciences; 1837–48 explored Abyssinia; 1867 made a member of above academy; 1882 went to St. Domingo to see the passage of Venus across the sun. Prin. work is *Géodésie de la haute Ethiopie* (Paris, 1873). His brother, Arnaud-Michel (1815–93), *b.* at Dublin; travelled with him. His prin. work is *Douze Ans dans la haute Ethiopie* (Paris, 1868), a record of the travels and observations of both.

Abbadie, Jacques (1654–1727), *b.* at Nay 1654 and educated at Puylaurens, Saumur, and Sedan, where he graduated D.D. In 1680 he was appointed pastor of a Fr. Protestant church in Berlin by Frederick William, Elector of Brandenburg. Between the years 1688 and 1689 he accompanied Marshal Schomberg to Holland, England, and Ireland, and was made pastor of the Fr. church in the Savoy. In 1699 he was made Dean of Killaloe by William III. He died at Marylebone, London, in 1727. His chief works are *Traité de la Vérité de la Réligion Chrétienne*, 1684; *Traité de la Divinité de Nôtre Seigneur Jésus Christ*, 1689; *L'Art de se connaître soi-même*, 1692; *Défense de la Nation Britannique*, 1692—a vindication of the revolution of 1688; *La Grande Conspiration d'Angleterre*, 1696, written by the order of William III.

Abbas (566–652), the uncle of Mohammed. He became the chief supporter of Mohammed, although he was at first opposed to him. The founder of the dynasty of the Abbasides (*q.v.*), who ruled as califs of Bagdad from 750 to 1258.

Abbas I., Shah of Persia 1585–1628, known as Shah Abbas the Great. He was *b.* 1557, was the son of Mohammed Mirza, and grandson of Tahmasp. He defeated the Turks in Ghilan and Azerbijan, 1590, and the Usbeks near Herat, 1597; honourably received Sir Anthony and Sir Robert Shirley, 1598, and in 1599 Sir Anthony was sent to the Christian princes of Europe to offer them the shah's friendship, with a view to some combination against the Turks. Abbas defeated the Turks in a great battle, 1605, and the Turks and Tartars ... Saltanieh a... Persians an... from the ... Abbas *d.* at ... his reign he ... promoted t... added largely to his dominions, and made Ispahan the cap. of his kingdom.

Abbas II., Shah of Persia 1642–66. He was *b.* in 1630, and during his reign promoted the prosperity of his people and tolerated the Christians. He took Kandahar, formerly taken by Abbas I., but lost under the Mogul domination.

Abbas III., Shah of Persia 1732–36. He was *b.* 1732, and crowned Shah when he was only eight months old; was the last of the Sophi dynasty.

Abbas Hilmy (1874–1923), last Khedive of Egypt, which, as Abbas II, he ruled before the Great War; studied at Theresianum Academy, Vienna; and succeeded his father Tewfik on the throne of Egypt, 1892. He at first tried to overthrow British rule, abolished and reduced taxes, and disagreed with Lord Cromer and Lord Kitchener. Affairs were, however, settled when Lord Kitchener retook the Egyptian Soudan, 1896–98, and Abbas visited England, 1899. He threw in his lot with Turkey in 1914; was deposed Dec. 18, 1914, and the khedivate passed, with the title of Sultan, to Hussein Kemal Pasha, his uncle. Died at Vienna.

Abbas-Mirza (1783–1833), Prince of Persia, and son of Shah Feth-Ali. He commanded the Persians against the Russians 1811–13 without success; concluded the Peace of Erzeroum with the Turks, 1823; in 1826–28 he again fought against the Russians, signing the Treaty of Tourkmantchaï, which gave to Russia the Persian dominions in Armenia and Caucasia.

Abbas Pasha, Abbas I. (1813–54), Viceroy of Egypt 1848–54, *b.* 1813, grandson of Mehemet Ali (Mohammed Ali). He took part in the Syrian war, 1840–41; became Viceroy of Egypt on the death of his uncle, Ibrahim Pasha, 1848; and was found dead, probably murdered, 1854. He was a bad ruler, and during his reign undid the good done by Mehemet Ali. He however promoted the establishment of the railway from Alexandria to Cairo, 1851.

Abbasides, a family of sovereigns who occupied the throne of the Arabian empire from A.D. 750 to A.D. 1258. The name is derived from their ancestor Abbas ben Abd-al-Motalleb, a paternal uncle of Mohammed. They made war on the Ommaiade califs, who had occupied the throne of the Arabian empire from 661, and completely defeated them in a battle on the banks of the R. Zab, near Mosul, 750. Under Harun-al-Raschid (786–808) the prosperity of the Abbaside empire was very great, flourishing towns were estab., literature and the arts were encouraged, and the splendour and luxury of the court of Bagdad are exhibited in many of the *Arabian Nights Tales*. Under Mamun (813–33) colleges and libraries were founded, and works on astronomy, mathematics, metaphysics, natural philosophy, and medicine were trans. from the Sanscrit and Greek into Arabic. In the ninth century the prosperity was broken by invasions from the Saracens and Turks, and by internal disturbances. From the time of Rhadi (934–40) almost all power had passed from the califs to the emirs al-Omara, and the califate then became a mere nominal dignity, with the possession of the tn. of Bagdad. The last calif, Mostasem, was defeated and killed by Hulaku, 1258, and thus ended the gov. of the Abbasides.

Abbate, Niccolo dell', *see* ABATI or ...

... **Abba-Comites** ... BBOT.

Abbatucci, Jacques-Pierre (1726–1812), a Fr. general, *b.* in Corsica. He submitted to France after attack... ...d was named ... Under the ... nded Corsica against the British, then followed Napoleon to Italy. He was the father of Charl...

Abbatucci, ... (1792–1857), ... the grandson of ... tucci, was *b.* ... Paris. In 1848 he was a member of

the constituent assembly, and Louis Bonaparte nominated him Minister of Justice in 1852. His three sons were all active servants of the republic.

Abbaye, a military prison close to the church of St. Germain des Prés; was built by Gamart between 1631 and 1635, and was the scene of a terrible massacre on Sept. 2 and 3, 1792, during the Fr. Revolution, mentioned by Carlyle in *The French Revolution* (Part III. bk. i. ch. iv.).

Abbazia, a tn. in Istria, Italy. Its position on the Bay of Fiume, and its warm climate, make it a favourite health resort. It is noted for its gardens and pretty villas. Pop. 2500.

Abbé, originally the Fr. term for abbot. Before the Fr. Revolution it was applied to many persons who had little or no connection with the church, but who acted as tutors, professors, and men of letters. 'Abbés commendataires' were persons who received revenues from their monasteries, but who were not necessarily monks.

Abbe, Cleveland (1838–1916), American meteorologist, *b.* in New York. Studied astronomy at Ann Arbor and Cambridge (Mass.), and spent two years in Russia at the Poulkovo Observatory. He became director of the Cincinnati Observatory in 1868, and meteorologist of the Weather Bureau in 1891. Both Michigan and Glasgow accorded him an honorary LL.D. Among his publications are: *Report on Standard Time*, 1879; *Preliminary Studies for Storm and Weather Predictions*, 1889; *The Mechanics of the Earth's Atmosphere*, vol. i. 1891, vol. ii. 1909; *Physical Basis of Long-Range Forecastings*, 1902.

Abbess, the superior of a nunnery or other female religious community. She is usually elected by the nuns subject to the approval of the bishop. In the Roman Catholic Church an A. possesses the same dignity and exercises the same functions as an abbot, except those of confession and preaching. According to a decree of the Council of Trent, it is recommended that an A., at the time of her election, should be at least forty years of age, and should have made profession for eight years; and it is forbidden that any person be elected to the dignity who has not been professed for five years, or is under thirty years of age.

Abbeville, a tn. near the mouth of the R. Somme in N. France. It is an important industrial and commercial centre; manufs. woollen goods, rope, sacking; does a considerable trade in grains; and has dyeing and bleaching works. The tn. is fortified, and is noted for the church of St. Wolfram, of which the façade is of the Gothic style. The houses are for the most part built of brick, but some old wooden ones still remain. Historically it is noted for two treaties which were concluded there—one between Henry III. of England and Louis IX. of France in 1259, and the other between Henry VIII. of England and Francis I. of France in 1527. Pop. 21,472.

Abbey (derived from the Fr. 'abbaye'), a religious community presided over by an abbot or abbess, a building occupied by the community, the church of a monastery, or a private dwelling-house. *See* MONASTERY.

Abbey, Edwin Austin (1852–1911), one of the foremost American figure-painters, was *b.* in Philadelphia. He was sent by Harper Brothers of New York to England in 1878 to gather material to illustrate Herrick's poems. These illustrations, together with his work on Shakespeare's plays, secured his fame. From 1891 to 1902 he was engaged on a series of panels, 'The Quest of the Holy Grail,' for the Boston Public Library, and in 1901 he was commissioned by Edward VII. to paint his coronation. Among his pictures may be mentioned: 'A May-Day Morning,' 'Fiametta's Song,' 'Crusaders sighting Jerusalem,' 'Pot-pourri,' and 'A Measure.' In 1896 he was elected A.R.A., and in 1898 he became an R.A., gaining later the titles of Chevalier of the Legion of Honour and Member of the National Academy of Design of New York.

Abbeyfeale, a tn. of Limerick on the Feale, Ireland. Pop. 947.

Abbeyleix, a tn., Queens co., near Maryborough, Ireland. Pop. 836.

Abbiategrasso, a tn. near Milan, Italy, on the Naviglio Grande Canal; was taken by Frederic I., 1167, and by Frederic II., 1245; pop. 12,700.

Abbot, the title of the head of a monastery or an abbey. The word 'abbot' or 'abbat' is derived through Syriac 'abba,' from the Heb. 'ab,' father. Originally the title was given as a mark of respect to any member of the clerical order, and when monastic institutions were first founded, to the head monk of the institution (not necessarily a priest). In the Greek Church the corresponding title to A. was Archimandrite (chief monk), or Hegumenos (leader). Since the sixth century monks have generally been priests. In orders founded after the tenth or eleventh century the title A. was discontinued, and superiors were known as priors, guardians, and rectors.

In dignity an A. is considered to stand next to a bishop. In England twenty-six As. and two priors (wearing the mitre and carrying the crozier) used to sit in the House of Lords. Cardinal-abbots were those who presided over an establishment with several branches; and in Germany there were prince-abbots as well as prince-bishops. In the tenth century there were field-abbots (in Latin 'Abbates Milites'), and abbot-counts ('Abba-Comites' or 'Abbi-Comites'), secular persons who rendered military service in return for certain abbeys bestowed upon them by the prince, and this practice continued in this country after it had been discontinued on the Continent.

An A. is usually elected by the monks, subject to the approval of the pope or of the bishop, according as the monastery is independent or under episcopal jurisdiction. There was friction between the As. and the church owing to an attempt by the abbots to free themselves from the authority of the diocesans. Some became independent and possessed great power and wealth. Long before the Reformation, however, their power was reduced to narrow limits, and subjected in all material points to the civil authority.

Abbot of Unreason, Lord or Abbot of Misrule, the title of the master of Christmas revels, used respectively in Scotland and in England while *L'abbé de Liesse* (*i.e.* Jollity) is the Fr. equivalent. In Sir Walter Scott's *Abbot*, Father Howleglas, a Kennaquhair masquer, owns this title.

Abbot, Charles, *see* COLCHESTER, LORD.

Abbot, George (1562–1633), Archbishop of Canterbury, *b.* at Guildford, Surrey, Oct. 29, son of a cloth-worker. Educated at the Grammar School, Guildford, and Balliol College. He became private chaplain to Thomas Sackville, Lord Buckhurst, Chancellor of the University, 1592; Master of University College, 1597; Dean of Winchester, 1600; three times Vice-Chancellor of Oxford University, 1600–5; chaplain to the Earl of Dunbar, 1608; Dean of Gloucester, 1609; Bishop of Lichfield and Coventry, 1609; Bishop of London, 1610; and Archbishop of Canterbury, 1611. He was a Calvinist and opposed Popery and Arminianism. A violent opposition of theological sentiment existed between him and Laud, making them political enemies and rivals. In 1621 he accidentally shot a keeper at Harringworth, but was formally pardoned by the king. He was deprived of his authority, 1627, for opposing the doctrine contained in sermons by Dr. Manwaring and Dr. Sibthorp; but was summoned as usual to Parliament, 1628. He was buried at Guildford. His works include: *Exposition on the Prophet Jonah; Geography, or a Brief Description of the Whole World; Narrative, containing the True Cause of his Sequestration and Disgrace at Court.*

Abbot, George (1604–48), nephew of George Abbot, Archbishop of Canterbury, fought on the parl. side in the Civil War. He wrote *Paraphrase of the Book of Job*, 1640; *Vindiciae Sabbati, or an Answer to Two Treaties of Mr. Broad*, 1641; and *Brief Notes upon the Whole Book of Psalms*, 1651.

Abbot, John, a poet, was educated at Sidney Sussex College, Cambridge, taking his degree of B.D. 1617. He wrote a poem entitled *Jesus Praefigured; or a Poeme of the Holy Name of Jesus*, 1623.

Abbot, Robert (1560–1617), elder brother of George Abbot, Archbishop of Canterbury, was educated at the Grammar School, Guildford, and Balliol College, Oxford. He became one of the chaplains in ordinary to James I., 1603; Master of Balliol College, 1609–15; Fellow of Chelsea College, 1610; Regius Professor of Divinity at Oxford, 1612; and Bishop of Salisbury, 1615. He was a great preacher, and wrote theological works, including: *The Mirror of Popish Subtilties*, 1594; *The Exaltation of the Kingdom and Priesthood of Christ*, 1601; *A Defence of the Reformed Catholic of Mr. William Perkins*, 1606; *Antologia contra apologiam A. Endaemon Johannem*, 1613; and *De Suprema Potestate Regia, contra Bellarminum et Suarez*, 1619.

Abbot, William (1789–1843), dramatist and actor; performed at Covent Garden, 1812; played Romeo to Miss Fanny Kemble's Juliet, 1830; and Appius Claudius and Modus in Sheridan Knowles's *Virginius* and *The Hunchback*. He wrote *Youthful Days of Frederick the Great* and *Swedish Patriotism*, two melodramas.

Abbot, Willis John, American author, *b.* at New Haven, Conn., 1863; author of *Blue Jackets of '76*; *Blue Jackets of 1812*; *Battle Fields of 1861*; *Carter Henry Harrison*; *Story of Our Navy for Young Americans*, 1910.

Abbotsford, on the r. b. of the Tweed, about 2 or 3 m. to the W. of Melrose, was the home of Sir Walter Scott from 1812 until his death in 1832. It was formerly a small farm, which Scott bought in 1811. He built a villa there and called it Abbotsford, and continued until 1817 to add new buildings of the old

baronial style, making it a picturesque and irregular estate. There is a large collection of books, curios, and paintings. *See* Lockhart's *Life of Sir Walter Scott.*

Abbot's Hall, a par. near Kirkcaldy, Fifeshire, Scotland, in which canvas is manufactured. Pop. 7500.

Abbots-Langley, a par. near Watford, England, said to be the bp. of Nicholas Breakspear, Pope Adrian IV. Pop. 4245.

Abbott, Alexander Crever, American physician, *b.* at Baltimore, 1860. Educated at Johns Hopkins Univ., and in Germany. Author of *The Principles of Bacteriology,* 1892; *The Hygiene of Transmissible Diseases,* 1899.

Abbott, Charles, *see* TENTERDEN, LORD.

Abbott, Charles Conrad, American naturalist, *b.* at Trenton, New Jersey, 1843. Author of *The Stone Age in New Jersey,* 1876; *Primitive Industry,* 1881; *Upland and Meadow,* 1886; *Recent Rambles,* 1892; *Travels in a Tree-top,* 1894; *The Birds About Us,* 1894; *In Nature's Realm,* 1900; and several novels.

Abbott, Rev. Edwin Abbott (1838–1926), was *b.* in London, and was educated at St. John's College, Cambridge. He was assistant master at King Edward's School, Birmingham, 1862–64; headmaster of the City of London School, 1865–89; and Hulsean Lecturer at Cambridge University, 1876. He was a select preacher at both Oxford and Cambridge, and the author of many works —mainly scholastic and theological. The most important are: *Shakespearian Grammar,* 1870; *Cambridge Sermons,* 1875; editing of *Bacon's Essays,* 1876; *Bacon and Essex,* 1877; *Through Nature to Christ,* 1877; *Philochristus: Memoirs of a Disciple of the Lord,* 1878; *Onesimus: Memoirs of a Disciple of St. Paul.* 1882; *Flatland,* by A. Square, 1884; *Francis Bacon: His Life and Works,* 1885; *Philomythus,* 1891; *The Anglican Career of Cardinal Newman,* 1892; *The Spirit on the Waters,* 1897; *St. Thomas of Canterbury: His Death and Miracles,* 1898; *Corrections of Mark adopted by Matthew and Luke,* 1901; *From Letter to Spirit,* 1903; *Johannine Vocabulary and Grammar,* 1905–6; *Silanus the Christian,* [illegible] 1907; *Notes on New* [illegible] 1907; *The Son o*[illegible] *to the Study of the Thoughts of Jesus,* 1910; and *The Fourfold Gospel* (in 5 parts), 1913–17.

Abbott, Emma (1849–91), an American singer, *b.* at Chicago; studied music in Europe; appeared in opera at Covent Garden, and later, having formed a company of her own, toured the United States. She *d.* at Salt Lake City.

Abbott, Evelyn (1843–1901), a classical writer, was *b.* in 1843, and educated at Balliol College, Oxford, where he became tutor and librarian, 1874. His chief works are: *Elements of Greek Accidence, with Philological Notes,* 1874; *Index to Plato, compiled for the Second Edition of Professor Jowett's Translation of the Dialogues,* 1875; edited *Hellenica: a Collection of Essays on Greek Poetry, Philosophy, History, and Religion,* 1880; and *A History of Greece,* 1901.

Abbott, Jacob (1803–79), an American author, *b.* at Hallowell, Maine, U.S.A., and educated at Bowdoin College, where he graduated 1820, and at Andover. He entered the ministry of the Congregational Church, but he is best known by his writings—educational and religious, and books for the young. The chief are: *The Teacher; Hoary Head and McDonner; Summer in Scotland; A Series of Celebrated Sovereigns; The Rollo Books,* about 32 vols.; *Franconia Stories,* 10 vols.; *Marco Paul's Adventures,* 6 vols.; *Harper's Story Books,* 36 vols.; *American History,* 8 vols.; *The Harlie Stories,* 6 vols.: *Rollo and Lucy Books of Poetry,* 3 vols.; *Florence Stories,* 6 vols.; *Juno Stories,* 4 vols.; *August Stories,* 4 vols.; *Aboriginal America; The Discovery of America; Gentle Measures in Training the Young; Rollo's Tour in Europe,* 10 vols.; *Science for the Young,* 4 vols.: and *Beechnut Tales.* Many of his works have been pub. in England, and many have been trans. into foreign languages in Europe and Asia.

Abbott, Sir John Joseph Caldwell (1821–93), son of Joseph Abbott, was *b.* at Argenteuil, Lower Canada, and educated at McGill University, Montreal. He became B.C.L., 1847; D.C.L.; M.P. for Argenteuil, 1859–74 and 1881–87; solicitor-general (east) in (Sandfield) Macdonald-Sicotte gov., 1862–63; and in 1865 he joined the Conservatives. In 1880 he became solicitor and in 1887 director for the Canadian Pacific Railway Company; was confidential adviser to Sir Hugh Allen at the time of the 'Pacific Scandal'; and delegate to England in connection with the dismissal of Letellier de St. Just. He was Canadian Privy Councillor, 1887, and Canadian Premier, 1891–92.

Abbott, John Stevens Cabot (1805–77), an historical writer, was *b.* at Brunswick, Maine, U.S.A. He was the brother of Jacob Abbott, and was educated at Bowdoin College and at the Theological Seminary,

Andover; became Congregational minister at various places in Massachusetts and Connecticut; but soon turned his attention to literature. His chief works are: *The Histories of Marie Antoinette, Josephine, Mad Roland, Cortez, Henry IV. of France; History of Napoleon Bonaparte*, 1852–55; *Napoleon at St. Helena*; *Confidential Correspondence of Napoleon and Josephine; History of the French Revolution: History of the Civil War in America*, 1863–65; *Lives of the Presidents of the United States*; *Life of Gen. U. S. Grant*, 1868; *History of Napoleon III.*, 1868; *Christopher Carson*, and *History of Frederick the Great*, 1871.

Abbott, Joseph Caldwell (1825–82), an American journalist, *b.* at Concord, New Hampshire. Educated at Phillip's Academy, Andover; studied law and practised journalism at Concord; re-organised the militia of New Hampshire, and was a member of the commission for adjusting the boundary of New Hampshire and Canada. He was active during the civil war, and was chosen senator afterwards; he *d.* at Wilmington.

Abbott, Lawrence Fraser (*b.* 1859), American auth. and editor, *b.* at Brooklyn, son of Lyman A. (*q.v.*); has edited works of Roosevelt and contributed the article on him to the *Encyc. Brit.*, 1910; has also written *Impressions of Theodore Roosevelt*, 1919; and *Twelve Great Modernists*, 1927.

Abbott, Leonard Dalton (*b.* 1878), an American Socialist, writer, and lecturer, *b.* at Liverpool; one of the editors of *Current Literature*. Author of *Francisco Ferrer*, 1910; pres. of the Free Speech League, 1910–14, and prominent on be[illegible] men Sicco and [illegible]

Abbott, Lyma[illegible] can Congregational minister and editor, was *b.* at Roxbury, Massachusetts. [illegible] church [illegible] Ward [illegible] signing [illegible] in-chief [illegible] pub. [illegible]; *The* [illegible] 1897; [illegible] *Ancient Hebrews*, 1901; [illegible] 1904; *Industr*[illegible] *The Home Build*[illegible] 1909; *The Spirit of Democracy*, 1910; *America in the Making*, 1911; *The Twentieth-Century Crusade*, 1918; *What Christianity Means to Me*, 1921; *Silhouettes of My Contemporaries*, 1922.

Abbott, Wallace Calvin (1857–1921), an American physician, *b.* at Bridgewater, Vermont; practised in Chicago; editor of *Amer. Jour. of Clin. Med.* Author of *Text-Book of Alkaloidal Therapeutics* (with W. F. Waugh).

Abbott, Wilbur Cortez (*b.* 1868), an American professor, *b.* at Kokomo, Ind.; graduated at Cornell. Professor of European history at University of Kansas and at Yale. Author of *Colonel Blood, Crown Stealer*, 1911; *The Expansion of Europe*, 1918; *Colonel John Scott of Long Island*, 1918; *Conflicts with Oblivion*, 1924; *The New Barbarians*, 1925.

Abbottabad, a tn. in the Hazara dist., N.W. Frontier Province, India, founded by Sir James Abbott; the headquarters of a brigade and an important military cantonment. Pop. 9000.

Abbreviation, in music, consists of signs or terms used to facilitate the work of the composer and copyist. There are many varieties: for instance, the passage A may be abbreviated into the form B, and C into that of D.

Abbreviations, methods by which the initial letter, the initial syllable, or a sign is made to represent a word or phrase, in order to save space and time. These methods were employed to a large extent in ancient inscriptions, Greek and Roman MSS. and documents. Abbreviations were also used in legal documents until the reign of George II., when they were discontinued. The following is a list of the most important abbreviactions used in England, but those which are most obvious, such as Mr. for Mister, Esq. for Esquire, Rev. for Reverend, E. for East, N. for North, S. for South, and W. for West, are omitted.

For musical abbreviations, *see* Music. For chemical abbreviations, *see* Elements.

A. A.A. Automobile Association. AAA. Amalgamation (*see* AMM.); Amateur Athletic Association. A.A.A.S. American Association for the Advancement of Science. A.A.G. Assistant Adjutant-General. A.A.S. (Academiæ Americanæ Socius) Fellow of the [illegible] A.B. (Artium [illegible]lor of Arts (*see* [illegible] (seaman). Abbr. or Abbrev. Abbreviated. Abp. Archbishop. Abr. Abridged. A.B.S. American Bible Society. A.C. (Ante Christum) Before Christ. A.C.A. Associated Chartered Accountant. Acc. or Acct. Account. A.C.S. American Colonisation Society. A.D. (Anno Domini) In the year of Our Lord. A.D.C. Aide-de-Camp. Ad lib. (Ad libitum) At pleasure. Adv. Advocate, Advent; (Ad valorem) At, or on, the value. Advt. Advertisement. Ae or Aet (Aetatis) Of age, Aged. A.F.B.S. American and Foreign Bible Society.

A.F.C. Air Force Cross. A.F. of L. American Federation of Labour. A.G. Adjutant-General, Accountant-General. A.G.S.S. American Geographical and Statistical Society. A.H. (Anno Hegiræ) In the year of the Hegira (622 A.D.). A.H.M.S. American Home Missionary Society. A.I.A. Associate of the Institute of Actuaries, American Institute of Architects. Ala. Alabama. A.L.A. American Library Association. A.M. (Artium Magister) Master of Arts (*see* M.A.); (Ante Meridiem) Before Noon; (Anno Mundi) In the year of the world. A.M.A. American Medical Association. A.M.D.G. (Ad Majorem Dei Gloria) To the greater glory of God. Am. Soc. C.E. American Society of Civil Engineers. Anon. Anonymous. A.O.H. Ancient Order of Hibernians. A.Q.M.G. Assistant

year from the building of th *i.e.* Rome (753 B.C.). A.V. A ised Version.

B. b. Baron, born. B.A. (B laureus (Artium) Bachelor of (*see* A.B.), British America. B Bachelor of Agriculture. B Baltimore (U.S.A.). Bart. or Baronet. B.C. Before Christ, Br Columbia. B.B.C. British Br casting Corporation. B.C.L. Ba lor of Civil Law. B.D. (Baccalau Divinitatis) Bachelor of Divin B.E.F. British Expeditionary Fo B.F.A. Bachelor of Fine Arts. B or B.LL. (Baccalaureus Legu Bachelor of Laws (*see* LL.B.). B. (Baccalaureus Medicinæ) Bache of Medicine (*see* M.B.). B.M. British Medical Association. B Bishop. B.P. British Public. B.S Bachelor of Science. B.S.L. Botan



ABBREVIATION IN MUSIC

Quartermaster-General. A.R.A. Associate of the Royal Academy. A.R.A.M. Associate of the Royal Academy of Music. A.R.H.A. Associate of the Royal Hibernian Academy. Ark. Arkansas. Ariz. Arizona. A.R.S.A. Associate of the Royal Scottish Academy. A.R.S.S. (Antiquariorum Regiæ Societatis Socius) Fellow of he Royal Society of Antiquaries. .R.W.S. Associate of the Royal ociety of Water Colour Painters. .S.A. American Statistical Association. A.S.E. Amalgamated Society Engineers. A.S.P.C. American ciety for Prevention of Cruelty. S.R.S. Amalgamated Society of ilway Servants. A.S.S.U. American Sunday School Union. A.T.S. erican Tract Society, American nperance Society. Att. or Atty. orney. Atty.-Gen. Attorney-eral. A.U.C. (Anno Urbis Con, or Ab Urbe Conditâ) In the

cal Society, London. B.S.P. British Socialist Party. B.V.M. Blessed Virgin Mary.

C. C. (Centum) A hundred (*see* Cent.), Conservative, Centigrade. Cantuar. Canterbury. C. or Cm. Centimetres. Cap. (Caput) Chapter. C.A. Chartered Accountant, Controller of Accounts. Cal. California, Calendar; (Calendæ) Calends. Cam. or Camb. Cambridge. Cant. Canticles, Canterbury. Cantab. (Cantabrigiensis) Of Cambridge. Cap. Capital. Carliol. Carlisle (Bp.'s sig.). C.B. Comp. of the Bath. C.B.E. Commander of the Order of the British Empire. C.B.S. Confraternity of the Blessed Sacrament. C.C. County Council, County Commissioner, County Court, Crown Clerk, Contra Credit; (Compte Courante) Account Current. C.C.C. Corpus Christi College. C.C.P. Court of Common Pleas. C.E. Church of England. C.E. Civil

Engineer. Cent. (Centum) A hundred (see C.). Centigrade. Cestr., Chester. C.F. Chaplain to the Forces. Cf. or Cp. (Confer) Compare. C.G. Commissary-General, Consul-General, Coast Guard. C.H. Court-House, ... Chapter. ... Chapter. ... dia. Ch. ... Christian. ... Criminal ... C.I.E. ... of the ... Imperial Volunteers (Boer War). C.J. Chief Justice. C.M. Common Metre, Certificated Master. C.M.G. Companion of the Order of St. Michael and St. George. C.M.S. Church Missionary Society. c/o, care of. Co. Company, County. C.O. Commanding Officer, Crown Office, Colonial Office, Criminal Office. C.O.D. *Cash (or Collect) on Delivery*. Col. Colonel, Colossians, Colonial, Column. Coll. College, Collector, Collection, Colleague. Coll. or Colloq. Colloquial. Colo. Colorado. Com. Commissioner, Commodore, Committee, Commerce, Commentary, Common. Comp. Compare, Comparative, Compound, Compounded. Compar. Comparative. Con. (Contra) Against, In opposition. Con. Cr. Contra Credit. Conn. Connecticut. Const. Constable, Constitution. Cor. Corinthians. Cor. Mem. Corresponding Member. Cor. Sec. *Corresponding Secretary*. C.O.S. Charity Organization Society. Cos. Cosine. Cot. Cotangent. C.P. Common Pleas, Clerk of the Peace, Court of Probate. C.P.C. Clerk of the Privy Council. C.P.S. (Custos Privati Sigilli) Keeper of the Privy Seal. Cr. Credit, Creditor. C.R. (Custos Rotulorum) Keeper of the Rolls. C.R.P. (Calendarium Rotulorum Patentium) Calendar of the Patent Rolls. C.S. Court of Session, Clerk to the Signet; (Custos Sigilli) Keeper of the Seal; (Christ. Scientist) Christian Science Church. C.S.A. Confederate States Army. C.S.I. *Companion of the* Order of the Star of India. C.S.M. Company Sergeant-Major. C.S.N. Confederate States Navy. C.T. Certified Teacher. Ct. Connecticut, Count, Court; (Centum) A hundred. C.T.C. Cyclist Touring Club. C.T.U. Christian Temperance Union. Cts. Cents. Cur. Current (*i.e.* this month). C.V. Common Version. C.V.O. Companion Royal Victorian Order. Cwt. (Lat. Centum, a hundred, and Eng. weight) A hundredweight.

D. d. (denarius or denarii) A penny or pence, Duke, died. D.Agr. Doctor of ... D.B.E. Dame of th... D.C. District of ... Again, or ... D.C.L. Doctor of Civil (or Common) Law. D.D. (Divinitatis Doctor) Doctor of Divinity. D.C.M. Distinguished Conduct Medal. D.D.S. Doctor of Dental Surgery. Def. Defendant. Deg. Degree, Degrees. Del. Delaware, Delegate; (Delineavit) He, or she, drew it—affixed to the draughtsman's name. Dem. Democrat, Democratic. D.Eng. Doctor of Engineering. Dep. Deputy, Department. Dept. Department, Deponent. Deut. Deuteronomy. D.F. Dean of the Faculty. D.F.C. Distinguished Flying Cross. D.F.M. Distinguished Flying Medal. D.G. (*Dei Gratia*) By the grace of God; (Deo Gratias) Thanks to God. Diam. Diar. Diameter. Dist. Atty. District Attorney. D.Lit. Doctor of Literature. D.L.O. Dead-Letter Office. Do. (Ditto) The same. Dols. Dollars. D.O.M. (Deo Optimo Maximo) To God (heading of *dedicatory inscriptions*). D.O.R.A. Defence of the Realm Act. D.P.H. *Department of Public Health*. D.P.O. Distributing Post-Office. Dr. Debtor, Doctor, Dram, Drams. D.Sc. Doctor of Science. D.S.C. Disting... Cross. D.S.M. ... Medal. D.S.O. ... Order. D.T. ... Doctor of Divinity, *Delirium* Tremens. D.V. (Deo Volente) God willing. D.V.S. Doctor of Veterinary Surgery. Dwt. (*Lat.* Denarius, and Eng. weight) Pennyweight or Pennyweights.

E. E. Earl. Ebor. (Eboracum) York. E.C. Eastern Central (Postal District, London). E.C.U. English Church Union. Ed. Editor, Edition. E.E. E... exempli gratiâ) ... Indies. Ency. ... Epistle. Eph. E... Equivalent. Esq. ... Esq. Esquire. Esth. Esther. et al. (et alibi) And elsewhere; (*et alii or aliæ*) And others. Etc. or &c. (Et cæteri, cæteræ, or cætera) And others, And so forth. et seq. (et sequentes or et sequentia) And the following. Ex. Examples, Exception, Exodus. Exch. Exchequer, Exchange. Exec. Executor. Execx. Executrix. Exon. (Exonia) Exeter. *Exor.(s.) Executor(s).* Ez. or Ezr. Ezra. Ezek. Ezekiel. E. and O.E. Errors and omissions excepted.

F. Fahr. Fahrenheit. F.A. Football Association. F.A.A.M. Free and Accepted Masons. F.A.S. Fellow of the Society of Arts, Fellow of the Antiquarian Society. Fcp. Foolscap. F.C.P. Fellow of the College of Preceptors. F.D. (Fidei Defensor) Defender of the Faith. Fec. (Fecit) He did it. F.E.S. Fellow of the Entomological Society, Fellow of the Ethnological Society. Feud. Feudal. F.F.A. Fellow of the Faculty of

Actuaries. F.G.S. Fellow of the Geological Society. F.H. Fire Hydrant. F.H.S. Fellow of the Horticultural Society. F.I.A. Fellow of the Institute of Actuaries. Fl. Flourished, Flemish. Fla. Florida. F.L.S. Fellow of the Linnæan Society. F.M. Field Marshal. F.O. Field Officer, Foreign Office. Fo. or Fol. Folio. For. Foreign. Fort. Fortification. F.P. Fire Plug. F.P.S. Fellow of the Philological Society. Fr. France, French. fr. From. F.R.A.S. Fellow of the Royal Astronomical Society, Fellow of the Royal Asiatic Society. F.R.A.M. Fellow of the Royal Academy of Music. F.R.C.P. Fellow of the Royal College of Physicians. F.R.C.S. Fellow of the Royal College of Surgeons. F.R.G.S. Fellow of the Royal Geographical Society. F.R.H.S. Fellow of theRoyal Horticultural Society. F.R.Hist.S. Fellow of the Royal Historical Society. F.R.I.B.A. Fellow of the Royal Institute of British Architects. F.R.S. Fellow of the Royal Society, F.R.S.E. Fellow of the Royal Society, Edinburgh. F.R.S.L. Fellow of the Royal Society of Literature, Fellow of the Royal Society, London. F.S.A. Fellow of the Society of Antiquaries. F.S.S. Fellow of the Statistical Society. Ft. Foot, Feet, Fort. Fur. Furlong. F.Z.S. Fellow of the Zoological Society.

G. g. Grammes. Ga. Georgia. G.A. General Assembly. Gal. Galatians, Gallon. G.A.R. Grand Army of the Republic. G.B. Great Britain. G.B.E. Grand Cross, Order of the British Empire. G.C. Grand Chapter. G.C.B. Grand Cross of the Bath. G.C.I.E. Grand Cross of the Indian Empire. G.C.L.H. Grand Cross of he Legion of Honour. G.C.M.G. rand Cross of St. Michael and St. eorge. G.C.S.I. Grand Cross of the tar of India. G.C.V.O. Grand Cross f the Victorian Order. G.D. Grand uke, Grand Duchess. Gen. Genesis, eneral. G.F.S. Girls' Friendly ociety. G.H.Q. General Headarters. G.L. Grand Lodge. G.M. and Master. G.M.T. Greenwich an Time. G.O. General Order. O.C. General Officer Commanding. O.C. in C. General Officer Comnding in Chief. G.O.M. 'Grand Man' (Gladstone). G.O.P. Grand Party (The Republican Party, .A.). G.P.O. General Post Office. Georgius Rex (King George). Great, Greek, Grain, Gross. Grand Secretary, Grand Scribe, d Sentinel. G.T. Good Tem-, Grand Tyler. H. Hydrogen. H.A.C. Honour- Artillery Company. H.B.C. on's Bay Company. H.B.M. r Her) Britannic Majesty. H.C. Heralds' College. Heb. or He Hebrew, Hebrews. H.E.I.C. Honoable East India Company. H Bd. Half-bound. H.G. Horse Guar Hg. (Hydrargyrum) Mercury. H. His (or Her) Highness, His Holine (the Pope). Hier. (Hierosolym Jerusalem. H.I. Hawaiian Island H.I.H. His (or Her) Imperial Highness. H.J.S. (Hic Jacet Sepultu Here lies buried. H.L.I. Highlan Light Infantry. H.M. His (or Her Majesty. H.M.P. (Hoc Monumentun Posuit) Erected this monument H.M.S. His (or Her) Majesty's Steamer, Ship, or Service. Ho. of Rep. House of Representatives. H.P. High Priest, Horse-power, Half-pay. H.Q. Headquarters. H.R.E. Holy Roman Empire, or Emperor. H.R.H. His (or Her) Royal Highness. H.R.I.P. (Hic Requiescit In Pace) Here rests in peace. H.S.H. His (or Her) Serene Highness. H.T. Hawaiian Territory.

I. Ia. Iowa. Ib. or Ibid. (Ibidem) In the same place. I.C.S. Indian Civil Service. Id. (Idem) The same. Ida. Idaho. I.D.B. Illicit diamond buyer. i.e. (id est) That is. I.G. Inner Guard. I.H.S. (erroneously Iesus [or Jesus] Hominum Salvator) Jesus the Saviour of Men. Ill. Illinois. I.L.P. Independent Labour Party. I.M. In Memoriam. Imp. Imperial; (Imperator) Emperor. Incog. (Incognito) Unknown. Ind. India, Indian, Indiana. I.T. or Ind. Ter. Indian Territory. In lim. (In limine) At the outset. In loc. (In loco) In its place. I.N.R.I. (Iesus [or Jesus] Nazarenus, Rex Iudæorum [or Judæorum]) Jesus of Nazareth, King of the Jews. Inst. Instant (the present month). In trans. (In transitu) On the passage. Intro. Introduction. I.M. Isle of Man. I.W. Isle of Wight. I.O.O.F. Independent Order of Odd Fellows. I.O.U. I owe you. i.q. (idem quod) The same as. I.R.A. Irish Republican Army. I.R.O. Inland Revenue Office. Irreg. Irregular. I.S. Irish Society. Is. or Isa. Isaiah. I.S.O. Imperial Service Order. I.T. Inner Temple, Indian Territory. It. or Ital. Italian, Italic, Italy. Itin. Itinerary. I.W.W. Industrial Workers of the World. I.Y. Imperial Yeomanry.

J. J. Justice. J.A. Judge Advocate. J.A.G. Judge Advocate General. J.C. Jesus Christ. J.D. Junior Deacon. Jer. Jeremiah. J.G.W. Junior Grand Warden. J.H.S. (*see* I.H.S.). Jno. John. Josh. Joshua. Jour. Journeyman, Journal. J.P. Justice of the Peace. J. Prob. Judge of Probate. Jr. Junior. J.U.D. (Juris Utriusque Doctor) Doctor of both Laws *i.e.* the Canon and the Civil Law).

K. Kan. Kansas. K.B. Knight of the Bath, King's Bench. K.B.E. Knight Commander of British Empire. K.C. King's Counsel, Knight of Colombo. K.C.B. Knight Commander of the Bath. K.C.H. Knight Commander of Hanover. K.C.I.E. Knight Commander of the Indian Empire. K.C.M.G. Knight Commander of St. Michael and St. George. K.C.S.I. Knight Commander of the Star of India. K.G. Knight of the Garter. Kgr. Kilogrammes. K.H. Knight of Hanover. Ki. Kings. K.M. Knight of Malta. Km. Kingdom. K.M.H. Knight of Merit (Holstein). Knt. or Kt. Knight. K.P. Knight of St. Patrick (Ireland). K.T. Knight Templar, Knight of the Thistle (Scotland). Ky. Kentucky.

L. L. London (in degrees); (Liber) Book; Liberal. L. lb. (Libra) A pound in weight. L. or £. A pound sterling. La. Louisiana. Lab. Labour, Laboratory. L.A.C. Licentiate of the Apothecaries' Company. Lam. Lamentations. L.A.S. Lord Advocate of Scotland. Lat. Latin, Latitude. l.b.w. Leg before wicket. L.C. Lord Chamberlain, Lord Chancellor. l.c. Lower case; (loco citato) In the place before cited. L.C.C. London County Council. L.C.J. Lord Chief Justice. Ld. Lord. L.D. Lady-Day, Light Dragoons. L.E.F. Liberté, Egalité, Fraternité (motto of French Republic). Lev. Leviticus. Lex. Lexicon. L.F.B. London Fire Brigade. L.G. Life Guards. L.G.B. Local Government Board. L.I. Long Island, Light Infantry. Lib. Librarian. Linn. Linnæus, Linnæan. Lit. Literature, Literary, Literally. Litt.D. Doctor of Literature. L. Lat. Low Latin, Law Latin. LL.B. (Legum Baccalaureus) Bachelor of Laws (*see* B.L. and B.LL.). LL.D. (Legum Doctor) Doctor of Laws. L.Mus. Licentiate in Music. L.M.S. London Midland and Scottish. Lon. or Lond. London. Lon. or Long. Longitude. Lou. or La. Louisiana. L.N.E.R. London and North Eastern Railway. L.P. Lord Provost, Large Paper. L.P.S. Lord Privy Seal. L.R.A.M. Licentiate Royal Academy of Music. L.R.C.P. Licentiate of the Royal College of Physicians. L.R.C.S. Licentiate of the Royal College of Surgeons. l.s. Left side; (Locus Sigilli) Place of the Seal. L.S.C. London Society of Compositors. L.S.D. (Libra, Solidi, Denarii) Pounds, Shillings, Pence.

M. M. Marquis, Monsieur; (Mille) Thousand; (Meridies) Meridian, or Noon. m. Metres. M.A. Military Academy; (Magister Artium) Master of Arts (*see* A.M.). M.A.B. Metropolitan Asylums Board. Macc. Maccabees. M.Agr. Master of Agriculture. Maj: Major. Maj.-Gen. Major-General. Man. Manitoba. Mass. Massachusetts. Matt. Matthew. M.B. (Medicinæ Baccalaureus) Bachelor of Medicine (*see* M.B.). M.B.E. Member of Order of British Empire. M.B.W. Metropolitan Board of Works. M.C. Member of Congress, Master of Ceremonies, M.C. Military Cross. M.C.C. Marylebone Cricket Club. M.D. (Medicinæ Doctor) Doctor of Medicine. Md. Maryland. Mdlle. or Mlle. Mademoiselle. M.E. Methodist Episcopal, Military or Mechanical Engineer, Most Excellent. Me. Maine. Med. Medicine. M.E.G.H.P. Most Excellent Grand High Priest. Mem. Memorandum, Memoranda; (Memento) Remember. Messrs. or MM. (Messieurs) Gentlemen, Sirs. Meth. Methodist. M.F. Master of Forestry. M.F.G.B. Miners' Federation of Great Britain. M.F.H. Master of Foxhounds. Mg. Milligrammes. M.I.C.E. Member of the Institute of Civil Engineers. Mich. Michigan, Michaelmas. Mid. Middle (voice), Midshipman. Mil. Military. Min. Minute, Minutes, Mineralogy. Minn. Minnesota. Min. Plen. Minister Plenipotentiary. Miss. Mississippi. M.L.A. Member of the Legislative Assembly. MM. (Messieurs), Gentlemen or Sirs, Their Majesties. Mme. Madame, Mo. Missouri, Month. Mod. Modern. Moderate. M.O.H. Medical Officer of Health. Mon. Monmouth. Mons. Monsieur or Sir. Mont. Montana. M.P. Member of Parliament. M.P.P. Member of Provincial Parliament (Canada). M.P.S. Member of the Pharmaceutical Society. M.R. Master of the Rolls. M.R.A.S. Member of the Royal Asiatic Society, Member of the Royal Academy of Science. M.R.C.C. Member of the Royal College of Chemistry. M.R.C.P. Member of the Royal College of Preceptors. M.R.C.S. Member of the Royal College of Surgeons. M.R.C.V.S. Member of the Royal College of Veterinary Surgeons. M.R.I. Member of the Royal Institute. M.R.I.A. Member of the Royal Irish Academy. M.S. (Memoriæ sacrum) Sacred to the Memory of. MS. Manuscript. M.Sc. Master of Science. MSS. Manuscripts. Mt. Mount, Mountain. Mts. Mountains. Mus. Music, Museum. Mus. Bac. Bachelor of Music. Mus. D. or Mus. Doc. Doctor of Music. M.V.O. Member of Victorian Order. M.W.B. Metropolitan Water Board. Myth. Mythology.

N. N. Note, Name, Noun, Neuter. N.A. North America. Nat. Natural, Natal, National. Nat. Hist. Natural History. Naut. Nautical. N.B. North Britain, North British, New Brunswick; (Nota bene) Note well, or Take notice. N.C. North Carolina,

New Church. N.C.O. Non-commissioned Officer. N.D. North Dakota. n.d. No date. N.D.L. Norddeutscher Lloyd (North German Lloyd S.S. Co.). N.E. New England. N.E.A. National Educational Association. Neb. Nebraska. Neg. Negative. Neh. Nehemiah. Nem. Con. (Nemine Contradicente) No one contradicting, *Unanimously*. *Neth.* *Netherlands.* Neut. Neuter. Nev. Nevada. N.F. Newfoundland. N.G. National Guard (U.S.A.). N.H. New Hampshire, New Haven. N.J. New Jersey. N.l. (Non liquet) It appears not, The case is not clear. N.L. or N. Lat. North Latitude. N.L.C. National Liberal Club. N.M. New Mexico. No. (Numero) Number. N.O. New Orleans. Nom. Nominative. Non-com. Non-commissioned Officer. Non-con. Non-content, *i.e.* dissentient (House of Lords). Non. obst. (Non obstante) Notwithstanding. Non Pros. (Non Prosequitur) He does not prosecute—a judgment entered *against the plaintiff when he does not* appear to prosecute. Non. seq. (Non sequitur) It does not follow. Nor. Norman. Nor. Fr. Norman French. Nos. Numbers. N.P. Notary Public. N.P.D. North Polar Distance. N.S. Nova Scotia, New Style (after the year 1752), Numismatic Society; (Nôtre Seigneur) Our Lord. N.S.J.C. (Noster Salvator Jesus Christus) Our Saviour Jesus Christ; (Nôtre Seigneur Jesu Christ) Our Lord Jesus Christ. N.S.P.C.C. National Society for the Prevention of Cruelty to Children. N.S.W. New South Wales. N.T. New Testament. N.u. Name, or names, unknown. Num. or Nums. Numbers. N.U.C. National Union of Clerks. N.U.T. National Union of Teachers. N.U.W.S.S. National Union of Women's Suffrage Societies. N.V.M. Nativity of the Virgin Mary. N.W.T. North-West Territory. N.Y. New York. N.Y.K. Nippur Yusen Kaisha (S.S. Co.). N.Z. New Zealand.

O. O. Ohio, Old. Ob. (Obiit) Died. Obs. Observatory, Obsolete, Observation. O.B.E. Officer of the British Empire. O.C. Officer Commanding. O.F. Odd Fellows. O.H.G. Old High German. Okla. Oklahoma. O.H.M.S. On His (Her) Majesty's Service. O.K. All correct. O.M. Old Measurement, Order of Merit. Ont. Ontario. Op. Opposite. O.P. Out of print, Opposite Prompt. Ore. Oregon. O.S. Old Style (previous to 1752), Out of stock. O.S.B. Order of St. Benedict. O.S.F. Order of St. Francis. O.T. Old Testament. O.T.C. Officers Training Corps. O.U.D.S. Oxford University Dramatic Society. Oxon. (Oxonia), Oxford; (Oxoniensis) Of Oxford. Oz. Ounce, or Ounces.

P. P. Page, Part, Participate, Pint, Pipe; (Pondere) By weight. P. & O. Peninsular and Oriental (Steam Navigation Co.). *Pa. Pennsylvania.* Parl. Parliament, Parliamentary. Part. Participle. Pass. Passive. Payt. Payment. P.C. Privy Council or Councillor, Police Constable; (Patres Conscripti) Conscript Fathers. Pd. *Paid.* *P.E.* *Protestant Episcopal.* P.E.I. Prince Edward Island. Penn. Pennsylvania. Pent. Pentecost. Per an. (Per annum) By the year. Per cent. or Per ct. (Per centum) By the hundred. Perp. Perpendicular. P.G. Past Grand, Paying guest. Phar. Pharmacy. Ph.B. (Philosophiæ Baccalaureus) Bachelor of Philosophy. Ph.D. (Philosophiæ Doctor) Doctor of Philosophy. Ph.G. Graduate in Pharmacy. Phil. Philippians, Philosophy, Philosopher, Philosophical, Philemon. Phila. Philadelphia. Phys. Physics. Physiology. P.I. Philippine Islands (U.S.A.). Pxt. (Pinxit) Painted. Pk. Peck. P.L. *Poet Laureate.* *Pl.* *Place, Plural.* P.L.A. Port of London Authority. P.L.C. Poor Law Commissioners. P.M. Post-Master, Past Master, Past Midshipman; (Post Mortem) After death. p.m. post meridiem. P.M.G. Post-Master-General. P.O. Post Office, Postal Order. P.O.O. Post-Office Order. Pop. Population, Popularity. Port. Portugal, Portuguese. pp. Pages. p.p. per pro. perprocuratorem. P.P. Parish Priest; (Pater Patriæ) Father of his Country. P.P.C. (Pour Prendre Congé) To take leave. Pph. Pamphlet. P.Q. Province of Quebec, Previous Question. Pr. Priest, Prince, Price. P.R. Prize Ring, Porto Rico; (Populus Romanus) The Roman people. P.R.A. President of the Royal Academy. P.R.C. (Post Romanum Conditum) From the building of Rome. Preb. Prebendary. Pref. Prefix. P.R.I.B.A. President of the Royal Institute of British Architects. Print. Printing. Prof. Professor. Prot. Protestant. Pro tem. (Pro tempore) For the time being. Prov. Proverbs, Proverbially, Provost, Province, Provincial. Prox. (Proximo) Next, or of the next month. P.R.S. President of the Royal Society. P.S. Permanent Secretary, Principal Sojourner, Privy Seal; (Post scriptum) Postscript. Ps. Psalm, Psalms. Pt. Pint, Payment, Point, Port. P.T.O. Please turn over. Pub. Public, Published, Publisher. Pub. Doc. Public Documents.

Q. Q. Question, Query, Queen. Q.B. Queen's Bench. Q.C. Queen's Counsel, Queen's College. Q.d. (Quasi dicat) As if he should say. Q.e. (Quod est) Which is. Q.E.D. (Quod Erat Demonstrandum) Which

was to be demonstrated. Q.E.F. (Quod Erat Faciendum) Which was to be done. Q.E.I. (Quod Erat Inveniendum) Which was to be found out. Q.l. (Quantum libet) As much as you please. Qm. (Quomodo) By what means. Q.M. Quartermaster. Q.M.A.A.C. Queen Mary's Army Auxiliary Corps. Q. Mess. Queen's Messenger. Q.M.G. Quartermaster-General. Q.P. or q.pl. (Quantum placet) As much as you please. Qr. Quarter (28 pounds), Farthing, Quire. Q.S. Quarter Sessions. Q.s. Quarter section; (Quantum sufficit) A sufficient quantity. Qt. Quart, Quantity. Qn. Queen, Question. Qu. or Quar. Quarterly. Qu. or Qy. (Quære) Query. Que. Province of Quebec. Ques. Question. Q.v. (Quod vide) Which see; (Quantum vis) As much as you will.

R. R. Railway, Rood, Rod, Rises, River, Read, Resides; (Rex) King; (Regina) Queen; (Recipe) Take. R.A. Royal Academy or Academician, Royal Artillery, Rear Admiral, Right [illegible] oyal Arca- [illegible] Chapter, [illegible] ble Club. [illegible] R.A.M. [illegible] R.A.O.C. [illegible] R.A.M.C. [illegible] R.A.S.C. Roya 'Army Service Corps. R.A.V.C. Royal Army Veterinary Corps. Rad. (Radix) Root, Radical. R.B.A. Royal Society of British Artists. R.C. Roman Catholic. R.C.P. Royal College of Physicians. R.C.R. Royal Canadian Regiment. R.D. Royal Dragoons, Rural Dean. R.D.S. Royal Dublin Society. R.E. Royal Engineers, Royal Exchange, Right Excellent. Rec. or R. Recipe. Recd. [illegible] Receipt. Rec. [illegible] retary. Rect. [illegible] F. Royal Fusi- [illegible] Reformer, Re- [illegible] Ref. Ch. Reformed Church. R.F.A. Royal Field Artillery. Reg. Register, Registrar, Regular. Reg. Prof. Regius Professor. Rem. Remark, Remarks, Remainder. Rep. Representative, Republic, Report, Reporter. Retd. Returned. Rev. Revelation, Reverend, Revolution, Review, Revenue, Revise. R.F. (République Française) French Republic. R.G.A. Royal Garrison Artillery. R.H.A. Royal Hibernian Academy, Royal Horse Artillery. R.H.G. Royal Horse Guards. R.I. Rhode Island. R.I.C. Royal Irish Constabulary. R.I.P. (Requiescat in pace) May he rest in peace. R.M. Royal Marines, Royal Mail, Resident Magistrate. R.M.A. Royal Military Asylum, Royal Marine Artillery. R.M.L.I. Royal Marine Light Infantry. R.M.S. Royal Mail Steamer. R.N. Royal Navy. R.N.A.S. Royal Naval Air Service. R.N.D. Royal Naval Division. R.N.R. Royal Navy Reserve. R.N.V. Royal Navy Volunteers. R.N.V.R. Royal Naval Volunteer Reserve. Ro. (Recto) Right-hand page. R.P. (Respublica) Republic. R.R. Railroad. R.s. Right-side. R.S.A. Royal Scottish Academy. R.S.E. Royal Society of Edinburgh. R.S.M. Royal School of Mines. R.S.V.P. (Répondez, s'il vous plaît) Answer, if you please. R.T.S. Religious Tract Society. R.V. Revised Version. R.W. Right Worthy, Right Worshipful. R.W.D.G.M. Right Worshipful Deputy Grand Master. R.W.G.R. Right Worthy Grand Representative. R.W.G.S. Right Worthy Grand Secretary. R.W.G.T. Right Worthy Grand Treasurer, Right Worshipful Grand Templar. R.W.G.W Right Worthy Grand Warden. Ry. Railway. R.Y.S. Royal Yacht Squadron.

S. S. South, Saint, Signor, Second (time), Shilling, Sun, Sets, See, Solo, Singular, Son. S.A. South Africa, South America, South Australia, Salvation Army. Sam. Samuel. San. or Sanc. Sanscrit. Sask. Saskatchewan. Sax. Saxon, Saxony. S.C. South Carolina; (Senatus Consultum) A decree of the Senate. S.A.R. Sons of the American Revolution. S. caps. Small capitals. Sc. (Scilicet) To wit, namely; (Sculpsit) He or she engraved it. Sch. (Scholium) A note. Sch. or Schr. Schooner. Sci. Science. Sclav. Sclavonic. *Scot.* Scotland, Scottish. Script. Scripture, Scriptural. Sculp. or Sculpt. Sculpture. S.D. Senior Deacon, South Dakota. S.D.F. Social Democratic Federation. Sec. Secretary, Second, Section. Sec. Leg. Secretary of Legation. Sen. Senate, Senator, Senior. Sep. or Sept. September, Septuagint. Seq. (Sequentes or Sequentia) The following, the next. Serg. or Serj. Sergeant or Serjeant. S.F. San Francisco. Sh. Shilling. S.I. Staten Island (U.S.A.). Sin. Sine (Trigonometry). Sing. Singular. S.J. Society of Jesus. S. Lat. South Latitude. S.M. State Militia, Short Metre, Sergeant-Major; (Sa Majesté) His or Her Majesty. S.M.I. (Sa Majesté Impériale) His or Her Imperial Majesty. Soc. Society. Sol. Solution. Sol Gen. Solicitor-General. S. of S. Secretary of State. S.O.S. (Wireless signal of distress). S.O.S.B.W. Society for the Oversea Settlement of British Women. Sp. Spain, Spanish, Spirit. S.P. (Sine Prole) Without issue. S.P.C.A. Society for the Prevention of Cruelty *to Animals.* S.P.C.K. Society for Promoting Christian Knowledge.

S.P.G. Society for the Propagation of the Gospel. S.P.Q.R. (Senatus Populusque Romanus) Senate and People of Rome. Sq. Square. Sq. cm. Square centimetres. Sq. ft. Square feet. Sq. in. Square inches. Sq. yds. Square yards. S.S. Sunday School, Saint Simplicius (the mark on the collar of the Chief Justice of England), Steamship. St. Saint, Street, Stone, Strait. S.S.R. Socialist Soviet Republic. S.T.D. (Sacræ Theologiæ Doctor) Doctor of Divinity. Ster. or Stg. Sterling. S.T.P. (Sacræ Theologiæ Professor) Professor of Theology. Subj. Subjunctive. Subst. Substantive, Substitute. Suff. Suffix. Sup Superior, Supplement, Superfine, Superlative. Supp. Supplement. Supt. Superintendent. Surg. Surgeon, Surgery. S.v. (Sub verbo) Under the word, or title. Sw. Swedish, Sweden. Switz. Switzerland. Syn. Synonym, Synonymous. Synop. Synopsis. Syr. Syria, Syriac.

T. T. Tenor, Town, Township, Ton; (Tutti) All together. T.A. Territorial Army. Tal. qual. (Talis qualis) Just as they come, average quality. Tan. Tangent. T.C. Thames Conservancy. Ten. or Tenn. Tennessee. Tex. Texas. Text. Rec. (Textus Receptus) Received Text. Thess. Thessalonians. T.H. Territory of Hawaii (U.S.A.). T.H.W.M. Trinity High Water Mark. T.O. Turn over. Tob. Tobit. t. & o.
aken and offered. T.N.T. trinotro-
oluene. Toc. H. (Talbot House).
om. Tome, or volume. Tonn. Ton-
age. Topog. Topography, Topo-
raphical. Tr. Translation, Translator,
ranspose. Trans. Transactions,
ranslated, Translation, Translator.
.S. Theosophical Society.
U. U. Unionist. U.C. (Urbs Con-
ta) Year of Rome. U.C.V. United
nfederate Veterans. U.D.C. Urban
strict Council. U.D.C. Union of
mocratic Control. U.F.C. United
ee Church. U.K. United King-
n. Ult. (Ultimo) Last or of the
month. Unit. Unitarian. Univ.
versity, Universally. U.P.C.
ted Presbyterian Church. u.s.
supra, uti supra) As above.
United States, United Service.
A. United States of America,
ed States Army. U.S.N.
ed States Navy. U.S.S. United
es Ship. U.S.S.R. Union of
list Soviet Republics. U.S.V.
d States Volunteers.
V. Verb, Verse, Vocation, Vol-
Viscount; (Vide) See; Ver-
Against. V.A. Vice-Admiral.
irginia. V.A.D. Voluntary Aid
nment. V C. Vice-Chancellor,
hairman, Victoria Cross. V.
Verb defective. V.G. Vicar
l; (Verbi Gratiâ) For example.

V.i. Verb intransitive. Vid. (Vide
See. Viz. (Videlicet) Namely, to wit
Vo. (Verso) Left-hand page. V.O
Victorian Order. Voc. Vocative
Vol. Volume. Vols. Volumes. V.P
Vice-President. V.S. Veterinary
Surgeon. Vt. Vermont. V.t. Verb
transitive. Vulg. Vulgate.

W. W. West, Week. W.A. Western Australia. W.A.A.C. Women's Army Auxiliary Corps. Wash. Washington. W.C.T.U. Women's Christian Temperance Union. W.E.A. Workers Educational Association. W.F.L. Women's Freedom League. w.f. Wrong fount. Whf. Wharf. W.I. West Indies. Wis. Wisconsin. W. Long. West Longitude. W.M. Worshipful Master. W.O. War Office. Wp. Worship. W.S. Writer to the Signet. W.S.P.U. Women's Social and Political Union. Wt. Weight. W. Va. West Virginia. Wyo. Wyoming.

X. X. or Xt. Christ. Xm. or Xmas. Christmas. Xn. or Xtian. Christian. Xnty. Christianity.

Y. Y. or Yr. Year. Y.B. Year Book. Yd. Yard. *Ym. Them. *Ye. The, Thee. Y.M.C.A. Young Men's Christian Association. Y.P.S. Young People's Society. Y.W.C.A. Young Women's Christian Association. *Yn. Then. *Yr. Their. Yr. Your. Yrs. Yours. *Ys. This. *Yt. That.

For Classical Abbreviations, *see* Graevius' *Thesaurus Antiquitatum* (1694); Mommsen's *Corpus Inscriptionum Latinarum* (1863); Alph. Chassant's *Paleographie* (1854), and *Campelli Dizionario di Abbreviature* (1899). *See also* DIPLOMATICS and PALEOGRAPHY.

Abbreviator is more particularly used for an officer of the Court of Rome, appointed as assistant to the vice-chancellor for drawing up the pope's briefs and reducing petitions, when granted by the pontiff, into proper form for being converted into bulls. The As. are supposed by Ciampini to be the successors either of the cancellarii of the imperial household or of the seven notarii said to have been placed by Pope Clement I. in the seven quarters of Rome, to write down the acts of the martyrs within their several districts. They are said to have taken their name either from their writing the brevia or shorter epistles of the pope, or from making use of notes or abbreviations in writing. A. is also a name given by some authors to an ancient literary academy supposed to have been at Rome in the fifteenth century and composed of the chief men of letters of the age, as Pomp. Lætus, Platina,

* The Y is a corrupt representation of the Anglo-Saxon þ, or th.

was to be demonstrated. Q.E.F. (Quod Erat Faciendum) Which was to be done. Q.E.I. (Quod Erat Inveniendum) Which was to be found out. Q.l. (Quantum libet) As much as you please. Qm. (Quomodo) By what means. Q.M. Quartermaster. Q.M.A.A.C. Queen Mary's Army Auxiliary Corps. Q. Mess. Queen's Messenger. Q.M.G. Quartermaster-General. Q.P. or q.pl. (Quantum placet) As much as you please. Qr. Quarter (28 pounds), Farthing, Quire. Q.S. Quarter Sessions. Q.s. Quarter section; (Quantum sufficit) A sufficient quantity. Qt. Quart, Quantity. Qn. Queen, Question. Qu. or Quar. Quarterly. Qu. or Qy. (Quære) Query. Que. Province of Quebec. Ques. Question. Q.v. (Quod vide) Which see; (Quantum vis) As much as you will.

R. R. Railway, Rood, Rod, Rises, River, Read, Resides; (Regina) Queen; (Rex) King; (Recipe) Take. R.A. Royal Academy or Academician, Royal Artillery, Rear Admiral, Right Ascension, Royal Arch, Royal Arcanum. R.A.C. Royal Arch Chapter, R.A.C. Royal Automobile Club. R.A.F. Royal Air Force. R.A.M. Royal Academy of Music. R.A.O.C. RoyalArmyOrdnanceCorps. R.A.M.C. Royal Army Medical Corps. R.A.S.C. Roya 'Army Service Corps. R.A.V.C. Royal Army Veterinary Corps. Rad. (Radix) Root, Radical. R.B.A. Royal Society of British Artists. R.C. Roman Catholic. R.C.P. Royal College of Physicians. R.C.R. Royal Canadian Regiment. R.D. Royal Dragoons, Rural Dean. R.D.S. Royal Dublin Society. R.E. Royal Engineers, Royal Exchange, Right Excellent. Rec. or R. Recipe. Recd. Received. Recpt. Receipt. Rec. Sec. Recording Secretary. Rect. Rector, Receipt. R.F. Royal Fusi- iers. Ref. Reformed, Reformer, Re- ormation, Reference. Ref. Ch. Re- ormed Church. R.F.A. Royal Field rtillery. Reg. Register, Registrar, egular. Reg. Prof. Regius Pro- essor. Rem. Remark, Remarks, emainder. Rep. Representative, epublic, Report, Reporter. Retd. eturned. Rev. Revelation, Rever- d, Revolution, Review, Re- nue, Revise. R.F. (République ncaise) French Republic. R.G.A. al Garrison Artillery. R.H.A. al Hibernian Academy, Royal se Artillery. R.H.G. Royal se Guards. R.I. Rhode Island. C. Royal Irish Constabulary. P. (Requiescat in pace) May he in peace. R.M. Royal Marines, l Mail, Resident Magistrate. A. Royal Military Asylum, Royal ne Artillery. R.M.L.I. Royal e Light Infantry. R.M.S. Royal Mail Steamer. R.N. Roy Navy. R.N.A.S. Royal Naval A Service. R.N.D. Royal Naval Div sion. R.N.R. Royal Navy Reserve R.N.V. Royal Navy Volunteers R.N.V.R. Royal Naval Volunteer Reserve. Ro. (Recto) Right-hand page. R.P. (Respublica) Republic. R.R. Railroad. R.s. Right-side. R.S.A. Royal Scottish Academy. R.S.E. Royal Society of Edinburgh. R.S.M. Royal School of Mines. R.S.V.P. (Répondez, s'il vous plait) Answer, if you please. R.T.S. Religious Tract Society. R.V. Revised Version. R.W. Right Worthy, Right Worshipful. R.W.D.G.M. Right Worshipful Deputy Grand Master. R.W.G.R. Right Worthy Grand Representative. R.W.G.S. Right Worthy Grand Secretary. R.W.G.T. Right Worthy Grand Treasurer, Right Worshipful Grand Templar. R.W.G.W Right Worthy Grand Warden. Ry. Railway. R.Y.S. Royal Yacht Squadron.

S. S. South, Saint, Signor, Second (time), Shilling, Sun, Sets, See, Solo, Singular, Son. S.A. South Africa, South America, South Australia, Salvation Army. Sam. Samuel. San. or Sanc. Sanscrit. Sask. Saskatchewan. Sax. Saxon, Saxony. S.C. South Carolina; (Senatus Consultum) A decree of the Senate. S.A.R. Sons of the American Revolution. S. caps. Small capitals. Sc. (Scilicet) To wit, namely; (Sculpsit) He or she engraved it. Sch. (Scholium) A note. Sch. or Schr. Schooner. Sci. Science. Sclav. Sclavonic. Scot. Scotland, Scottish. Script. Scripture, Scriptural. Sculp. or Sculpt. Sculpture. S.D. Senior Deacon, South Dakota. S.D.F. Social Democratic Federation. Sec. Secretary, Second, Section. Sec. Leg. Secretary of Legation. Sen. Senate, Senator, Senior. Sep. or Sept. September, Septuagint. Seq. (Sequentes or Sequentia) The following, the next. Serg. or Serj. Sergeant or Serjeant. S.F. San Francisco. Sh. Shilling. S.I. Staten Island (U.S.A.). Sin. Sine (Trigonometry). Sing. Singular. S.J. Society of Jesus. S. Lat. South Latitude. S.M. State Militia, Short Metre, Sergeant-Major; (Sa Majesté) His or Her Majesty. S.M.I. (Sa Majesté Impériale) His or Her Imperial Majesty. Soc. Society. Sol. Solution. Sol Gen. Solicitor-General. S. of S. Secretary of State. S.O.S. (Wireless signal of distress). S.O.S.B.W. Society for the Oversea Settlement of British Women. Sp. Spain, Spanish, Spirit. S.P. (Sine Prole) Without issue. S.P.C.A. Society for the Prevention of Cruelty to Animals. S.P.C.K. Society for Promoting Christian Knowledge.

S.P.G. Society for the Propagation of the Gospel. S.P.Q.R. (Senatus Populusque Romanus) Senate and People of Rome. Sq. Square. Sq. cm. Square centimetres. Sq. ft. Square feet. Sq. in. Square inches. Sq. yds. Square yards. S.S. Sunday School, Saint Simplicius (the mark on the collar of the Chief Justice of England), Steamship. St. Saint, Street, Stone, Strait. S.S.R. Socialist Soviet Republic. S.T.D. (Sacræ Theologiæ Doctor) Doctor of Divinity. Ster. or Stg. Sterling. S.T.P. (Sacræ Theologiæ Professor) Professor of Theology. Subj. Subjunctive. Subst. Substantive, Substitute. Suff. Suffix. Sup Superior, Supplement, Superfine, Superlative. Supp. Supplement. Supt. Superintendent. Surg. Surgeon, Surgery. S.v. (Sub verbo) Under the word, or title. Sw. Swedish, Sweden. Switz. Switzerland. Syn. Synonym, Synonymous. Synop. Synopsis. Syr. Syria, Syriac.

T. T. Tenor, Town, Township, Ton; (Tutti) All together. T.A. Territorial Army. Tal. qual. (Talis qualis) Just as they come, average quality. Tan. Tangent. T.C. Thames Conservancy. Ten. or Tenn. Tennessee. Tex. Texas. Text. Rec. (Textus Receptus) Received Text. Thess. Thessalonians. T.H. Territory of Hawaii (U.S.A.). T.H.W.M. Trinity High Water Mark. T.O. Turn over. Tob. Tobit. t. & o. taken and offered. T.N.T. trinotrotoluene. Toc. H. (Talbot House). Tom. Tome, or volume. Tonn. Tonnage. Topog. Topography, Topographical. Tr. Translation, Translator, Transpose. Trans. Transactions, Translated, Translation, Translator. T.S. Theosophical Society.

U. U. Unionist. U.C. (Urbs Condita) Year of Rome. U.C.V. United Confederate Veterans. U.D.C. Urban District Council. U.D.C. Union of Democratic Control. U.F.C. United Free Church. U.K. United Kingdom. Ult. (Ultimo) Last or of the last month. Unit. Unitarian. Univ. University, Universally. U.P.C. United Presbyterian Church. u.s. (ut supra, uti supra) As above. U.S. United States, United Service. U.S.A. United States of America, United States Army. U.S.N. United States Navy. U.S.S. United States Ship. U.S.S.R. Union of Socialist Soviet Republics. U.S.V. United States Volunteers.

V. V. Verb, Verse, Vocation, Volume, Viscount; (Vide) See; Versus) Against. V.A. Vice-Admiral. Va. Virginia. V.A.D. Voluntary Aid Detachment. V.C. Vice-Chancellor, Vice-Chairman, Victoria Cross. V. def. Verb defective. V.G. Vicar General; (Verbi Gratiâ) For example.

V.i. Verb intransitive. Vi See. Viz. (Videlicet) Name Vo. (Verso) Left-hand pa Victorian Order. Voc. Vol. Volume. Vols. Volum Vice-President. V.S. Ve Surgeon. Vt. Vermont. V. transitive. Vulg. Vulgate.

W. W. West, Week. Western Australia. W Women's Army Auxiliary Wash. Washington. W. Women's Christian Temp Union. W.E.A. Workers tional Association. W.F.L. Wo Freedom League. w.f. Wrong Whf. Wharf. W.I. West I Wis. Wisconsin. W. Long. Longitude. W.M. Worshipful M W.O. War Office. Wp. Wor W.S. Writer to the Signet. W.S. Women's Social and Political U Wt. Weight. W. Va. West Virg Wyo. Wyoming.

X. X. or Xt. Christ. Xm. Xmas. Christmas. Xn. or Xt Christian. Xnty. Christianity.

Y. Y. or Yr. Year. Y.B. Yo Book. Yd. Yard. *Ye. The, Th *Ym. Them. Y.M.C.A. Young Me Christian Association. Y.P.S. You People's Society. Y.W.C.A. You Women's Christian Associatio *Yn. Then. *Yr. Their. Yr. You Yrs. Yours. *Ys. This. *Yt. That.

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* The Y is a corrupt representation of the Anglo-Saxon þ, or th.

Pontanus, Sannagarius, Sabellicus, etc., who, by the rule of the society, changed their names at their admission for those of ancient Greeks or Romans, but the existence of such an academy is doubtful.

Abbt, Thomas (1738–67), a German author, *b.* at Ulm; studied at Halle. Appointed professor of philosophy, in 1760, at Frankfort, and of mathematics at Renteln, Westphalia: one of the creators of modern German prose. There is a *Life* by Nicolai.

A.B.C. Powers, a term usually applied to Argentine, Brazil and Chile. These nations associated themselves together not only because they were the wealthiest, most populous and most powerful states of S. America, but also because, until the revolutions of the past two years, they were the most stable. By mutual understanding, rather than by formal treaty, they became associated more or less to resist what seemed to them the encroachment of the U.S.A. upon Central and South America through the Monroe Doctrine and through what is known as 'dollar diplomacy.' Among their notable demonstrations was their offer in April 1914 to act as mediators when it seemed as if the U.S.A. and Mexico were drifting into war. President Woodrow Wilson promptly accepted their offer.

Abdalattif, an Arabian physician and writer, *b.* at Bagdad 1162 A.D. Held professorships at Mosul, Damascus, and Cairo, and at the latter place wrote in 1203, a *Compendium of the History of Egypt*. The titles of 166 works by Abdalattif have been recorded, about one-fourth of which are on medical subjects.

Abd-el-Kader (1807–83), Algerian patriot and hero of the long struggle against the Fr. This he commenced at Oran in 1833, and with varying fortune sustained till he surrendered to General De Lamoricière in 1847. He displayed great skill and perseverance in h[illegible] paign, and in [illegible] Fr. General [illegible] his authority in a treaty. On a resumption of hostilities he inflicted a serious defeat on a large Fr. army at Makta, but he was driven to seek refuge in Morocco in 1843. After his final capture he was released by Louis Napoleon in 1852, and received a pension of 100,000 francs. In retirement at Damascus he wrote a book on the consolations of philosophy under the title, *Rappel à l'Intelligent; avis à l'Indifférent*, 1858, and supplied commentaries to N. J. E. Daumas' *Chevaux du Sahara*, 1858. *See* A. Bellemare's *Abd-el-Kader*, 1863; C. H. Churchill's *Life of Abd-el-Kader*, 1867.

Abdel Krim, the leader of the Rifs in the Moroccan campaigns 1921 and 1925. The son of a tribal chieftain, he is a man with some pretensions to culture and was, in the heyday of his brief career of military adventure, an able leader and an adept in the arts of intrigue. During the Great War Krim was in the Spanish service and engaged in helping the Spanish authorities to consolidate their hold on their Treaty zone. Later, however, he turned against his Spanish masters and strove to incite the Rifs against the invader. So successful was he in the field, notably near Melilla, where he almost exterminated an army of some 20,000, that he produced an upheaval in Spain, with the result that a military Dictatorship was established to cope with the situation. In 1925 he launched an offensive against the Spaniards, this really being his only course when the French had joined the latter. Previously Genl. Primo de Rivera, the Spanish Dictator, had offered to make peace on terms very favourable to the Rifs, but the offer was refused by A. K., who wanted nothing less than complete independence. Ultimately he was forced to abandon the [illegible] tired of fighting, and in May 1926 he surrendered unconditionally to the French Moroccan commander.

Abd-el-Rahman, Moorish chief, invaded Gaul in 731 at the head of the largest Mohammedan army which had yet menaced Christendom. He was defeated and slain by Charles Martel at Tours. Abd-el-Rahman I. founded in 755 at Cordova the Ommiade dynasty of Spanish califs. The second calif of this name, 822–52, was a great patron of learning, and under the third, 912–61, the Cordova califate attained its most brilliant period. The fourth was killed in battle near Granada, 1021, and the last monarch of the name was assassinated in 1023. *See* Moors in Spain.

Abdera, tn. in Thrace; the bp. of such distinguished men as the philosopher Democritus and the historian Hecatæus, but nevertheless its inhab. had a reputation for stupidity, and 'Abderite' became a term for a simpleton.

Abdication, the voluntary renouncing and giving up of an office by a ruler or sovereign. The essential characteristic of abdication is that it is *voluntary*, but it is generally the result of internal or external pressure upon the holder of office. In a few striking instances office has been relinquished in the plenitude of

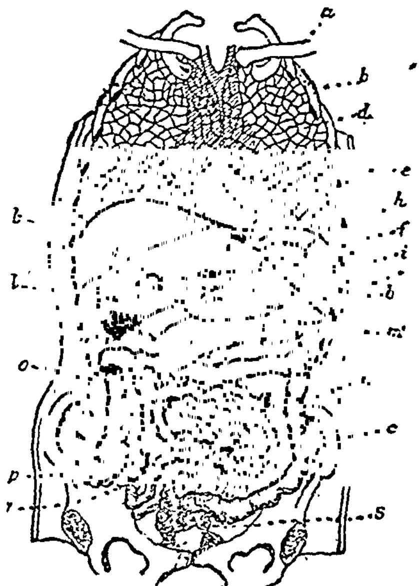
power owing to a desire for the freedom of private life, as was the case with the Roman dictators Cincinnatus, B.C. 438, Sylla, B.C. 80, and the Roman Emperor Diocletian, A.D. 305. One monarch, Philip V. of Spain, who abdicated (1724) in favour of his son, resumed the regal functions after his son's death. Other notable abdications in more modern times are: Isabella II. of Spain, June 25, 1870; Amadeus I. of Spain, Feb. 11, 1873; Prince Alexander of Bulgaria, Sept. 7, 1886; Milan of Servia, March 3, 1889; Oscar of Norway, Oct. 27, 1905; Abdul Hamid II. of Turkey, April 27, 1909; Manoel of Portugal, Oct. 4, 1910. The latest and by far the most notable abdication is that of the Emperor Pu-yi of China, who not only abdicated (Feb. 12, 1912), but by a final decree converted China from an absolute autocracy into the largest republic in the world. According to Blackstone, no English sovereign may abdicate without the consent of parliament. This was done in the case of James II. (1688), who was declared by a joint sitting of both houses to have abdicated.

The abdications during or after the Great War were: Nicholas II of Russia, 1917 (*see* RUSSIAN REVOLUTION); Ferdinand (of Bulgaria), 1918; Wilhelm II of Germany, 1918; Nicholas of Montenegro left his country in 1916 and was dethroned in 1918; Constantine of Greece, 1917 (restored 1920), abdicated finally, 1922; Karl of Austria, 1918; and Muhammud VI of Turkey, 1922.

Abdomen, that part of the body separated from the thorax by the diaphragm, enclosed by the lower ribs and muscles of the belly, and supported by the pelvis. The diaphragm is a partition of membrane and muscle with a movement determining the action of the lungs in breathing. The whole abdominal cavity is lined by a membrane called the *peritoneum*, which is the seat of the inflammation known as peritonitis. The term abdominal cavity lends itself to a possible misunderstanding, as it is most economically packed with a number of organs which are concerned in the nutrition of the body, and whose relative positions are adjusted by a system of enclosing muscles. If these muscles are not properly co-ordinated, the contents of the cavity are liable to protrude through the abdominal wall, giving rise to a hernia, or rupture.

Of the organs themselves, it is unnecessary in this place to do more than indicate the position of the more important. The stomach is situated in the upper part of the abdomen, with the liver in front, and the kidneys, pancreas, and spleen behind. From the stomach, the intestines, with a total length of about twenty-five feet, lead to the rectum.

Serious disease within the abdomen is now often investigated and treated by opening the muscular wall, the operation being attended with comparatively little danger if proper precautions against septic poisoning are possible. In cases of wounds penetrating the abdomen, particularly under unhealthy conditions of climate, it is more usual to avoid



DIAGRAMMATIC VIEW OF THE PRINCIPAL ORGANS OF THE THORAX AND ABDOMEN. *a*, clavicle; *b*, ribs; *c*, pelvis; *d*, lungs; *e*, heart; *f*, position of the diaphragm in extreme expiration; *g*, ditto in extreme inspiration; *h*, stomach; *i*, spleen; *k*, liver; *l*, kidney; *m*, pancreas; *n*, small intestine; *o*, large intestine; *p*, cæcum; *q*, vermiform appendix; *r*, rectum; *s*, bladder.

surgical measures, unless dangerous internal bleeding makes it advisable to suture, or stitch up, the bowel or intestine.

Abduction in anct. legal codes the word implied the unlawful taking away of a free person, or a slave of another person. Under the Roman criminal law the word *plagium* stood for the buying of a free person, and the term is still used in Scotland for the theft of a child. In English law, abduction technically means the

taking away by force, fraud, or persuasion of a woman (or child) against her own will, or, if the woman be under 21, against the will of her parents or guardians. The term is also applied under the Corrupt and Illegal Practices Act, 1883, to the action of preventing the free exercise of the franchise of any elector. The common forms of the crime are defined by the Criminal Law Consolidation Act, 1861, and the crime is also dealt with in the Criminal Law Amendment Act, 1885. The more serious forms of the offence, the abduction of women, are held to be a felony, and the heavy penalty of 14 years' imprisonment may be inflicted. It is also a misdemeanour punishable by a term of 2 years' imprisonment to take a girl under 18 for the purpose of seduction, provided there were no reasonable grounds for supposing the girl to be above 18. The abduction of children under 14 is technically called 'child-stealing,' and liable to a maximum term of 14 years' penal servitude, but the mother of a child or the father of an illegitimate child cannot be indicted. Abduction must not be confused with *kidnapping*. The latter includes the theft of any person, but is more properly applied to taking away beyond the seas—so that the person loses the protection of his country's laws. Throughout the United States abduction is a felony, and in some states is punishable by a fine, not exceeding 10,000 dols., or by solitary confinement at labour for a term not exceeding 25 years.

Abdul-ahi-el-Taachi, or **Abdullahi ibn seyid Mohammed** (*c.* 1850–99), 'Khalifa,' follower of the Mahdi, Mohammed-Ahmed, succeeded him in 1885. He was defeated by Kitchener at Omdurman in 1898, and killed at the battle of Om Debrikat in 1899.

Abdul Asiz (III of Nejd) Ibn Sa'ud, king of the Hejaz, *b.* at Riyadh, entral Arabia, *c.* 1880; son of Abdulrahman—a younger son of aisal, sultan of Nejd 1834–67. On he death of Faisal, Ibn Rashid, presenting a rival dynasty, came uth and drove out the Wahabi nasty to which A. A. belonged. s father led an unsuccessful rising 1900; A. A. next year with a small ce surprised Riyadh and was proimed Sultan of Nejd. The Turks ntinued to support his rivals, whom defeated in 1904; by 1908 he was ure in his sultanate. In 1913–14 urned the Turks out of the eastern vince of El Hasa. His efforts the side of the British early in Great War were unsuccessful. eafter, in defiance of Britain, he successfully fought Husain, King the Hejaz, over the possession Khurman. Having defeated h northern foes in 1920, and extende his boundaries elsewhere in 1922, h invaded the Hejaz in 1924. Husai abdicated in favour of his son, wh left Mecca to the Wahabis in October On Jan. 8, 1926, A. A. was proclaimed king of the Hejaz. Nejd and its dependencies were added to that kingdom in 1927.

Abdul-Aziz (1830–76), Sultan of Turkey, succeeded his brother, Abdul Medjid, in 1861. His reign was one long struggle against revolt; Bosnia, Herzegovina, Crete, Roumania, and Servia all rising against his misgovernment. He was deposed May 30, 1876, and found dead four days later.

Abdul-Hamid I. (1725–89), Sultan of Turkey, came to the throne 1774. His reign was signalised by the struggle with Russia and Austria. The former wrested from him the Crimea in 1783, and the latter inflicted a crushing defeat on him at the battle of Ochakov (1788).

Abdul-Hamid II. (1842–1918), Sultan of Turkey, succeeded in 1876, on the deposition of his brother, Murad V., and was himself deposed in 1909. In his reign occurred wars with Serbia (1876), Russia (1877–8), Greece (1897). The Armenian atrocities (1894–6) earned him the titles 'Great Assassin' (Gladstone), and 'Abdul the Damned' (poem by Sir Wm. Watson). The revolution of the 'Young Turks' which deposed him estab. parl. gov. in Turkey. He was kept prisoner in Salonika till it was taken by the Greeks in 1912, when he was removed to Constantinople. In 1915 he was transferred to Magnesia near Smyrna, where he died Feb. 10, 1918.

Abdul-Medjid (1823–61), the 'Grand Sultan' of Turkey, succeeded to the throne (1839), eight days after the disastrous defeat of his father's (Mahmud II.) army at Nisib by Mehemet Ali, the rebellious viceroy of Egypt. The intervention of the Christian powers checked the advance of the victorious Egyptians on Constantinople, and thus saved the Othman dynasty. The treaty of 1841, imposed on both parties by the European powers, settled the relationship of Egypt to Turkey. This sultan instituted many reforms, the rights of person and property being, *inter alia*, secured to all his subjects irrespective of their creed. The Crimean War between England and France, on the one hand, and Russia on the other, arose from Russia's claim to a protectorate over his orthodox subjects.

Abd-ur-Rahman (1778–1859), Sul-

tan of Morocco, reigned from 1823 to 1859. Much of his time was occupied in putting down internal insurrection. It was during his reign that the practice was abandoned of European states paying a tribute for protection against the piracy of the Moors.

Abd-ur-Rahman Khan (either 1830 or 1844–1901), Amir of Afghanistan from 1880. Supported successfully for a while the claim of his father, Afzul, against his uncle, Shere Ali, but in 1868 had to take refuge in Russian Turkestan. Finally he overcame the son of Shere Ali, Yakub Khan, and firmly estab. himself as Amir. He was eminently friendly to Great Britain, and did much to consolidate his power and to promote the social welfare of his country.

Abecedarians, name (derived from A B C) of small sect of Ger. anabaptists. Holding that only a knowledge of the Scriptures, communicated by the Holy Spirit direct, was necessary, they refused to learn to read.

À Becket, Thomas, *see* BECKET.

À Beckett, Arthur William (1844–1909), journalist and dramatist, son of Gilbert Abbott à Beckett (*q.v.*). During the Franco-German War he acted as war correspondent to the *Standard* and the *Globe*. He joined the staff of *Punch* in 1874. Among his publications are *London at the End of the Century*, 1900; *The à Becketts of Punch*, 1903.

À Beckett, Gilbert Abbott (1811–56), was the first editor of *Figaro in London*, one of the first contributors to *Punch*; he wrote leaders and articles for the *Times*, *Morning Herald*, and *Illustrated London News*. Essentially a playwright, having produced fifty plays, he helped to dramatise some of Dickens' novels; his fame now principally rests on his *Comic Blackstone* and comic histories f England and Rome.

À Beckett, Gilbert Arthur (1837–), journalist and dramatist, son of lbert Abbott à Beckett, wrote any plays, collaborating with Hern Merivale in *The White Pilgrim*, formed in 1874, and contributed *Punch* from 1879 to 1891. *See* M. Spielmann's *History of Punch*, 5; A. W. à Beckett's *The à kctts of Punch*, 1903.

bel, 'breath' or 'vapour,' second of Adam (Gen.). He was a herd, and because he offered to a more acceptable sacrifice than of his brother Cain, the latter him in a fit of jealousy. Ranks e first martyr.

l (*d.* 764), archbishop of ns; aided Boniface in missionork in Germany.

, Carl (1837–1906), German philologist. He was *b.* in Be educated at the universities of Be Munich, and Tübingen, and lect at Oxford and Berlin. He numerous works, which include: guistic Essays*, 1880; *Slavic* *Italian*, 1881; *Über den Gegens* *der Urworte*, 1884; and *Russland u* *die Lage*, 1888.

Abel, Carl Friedrich (1725–87), G musician, player on the viol-d gamba, and composer of man melodious pieces. Originally in th court band at Dresden, he came t England in 1759 and became one o the queen's chamber musicians. Joined John Christian Bach in giving concerts in England, 1759.

Abel, Sir Frederick Augustus (1827 1902), a high authority on explosives, sharing with Professor Dewar the credit for inventing cordite. Also invented close-test apparatus for ascertaining the flash-point of petroleum. Commenced his career as professor of chemistry at the Royal Military Academy (1851–5), and was afterwards appointed chemist to the War Department (1854–88). He was the first director of the Imperial Institute, being appointed in 1887, and pub. many important works on gunpowder and other explosives.

Abel, Niels Henrik (1802–29), Norwegian mathematician, *b.* at Findö, son of a clergyman. Entered university, Christiania, 1821, and later became a lecturer there. Is chiefly known for his development of the theory of elliptical functions and algebraic equations. In 1825 the gov. gave him an allowance to enable him to travel, and after his premature death from consumption, pub. his works.

Abelard (Abailard), **Peter** (1079–1142), scholastic philosopher and theologian, *b.* at Pallet near Nantes; destined to a martial career, he gave up his patrimony and right of primogeniture to study the sciences of his time, and became the disciple of William of Champeaux: he soon rivalled his master in dialectics. At the age of 21 he opened a school of his own, first at Melun, then at Corbeil, and finally at Paris in 1115, where he found that Wm. of Champeaux had been made bishop of Chalons sur Marne. The dialectic conflicts now over Abelard went to Laon, where he studied divinity under Anselm, dean of the chapter of that tn.; he soon returned to Paris and estab. a school of divinity there, in which he had 5000 pupils; in this school were trained a pope, 19 cardinals, and more than 50 bishops. When he was about 36 years of age, he became enamoured of Héloïse, a damsel of about 17 years of age, and daughter

to Fulbert, canon in the cathedral at Paris; he became her tutor. She returned his love and bore him a son, being secretly married. Not to impede Abelard's preferment she declared that there was no marriage, and Fulbert, enraged, caused Abelard to be cruelly mutilated, which he knew would prevent preferment in the church. Abelard recovered; the perpetrators of this crime were similarly punished, and he retired to the monastery of St. Denis, while Héloïse became a nun in the convent of Argenteuil. At the call of his



THE TOMB OF ABELARD AND HÉLOÏSE

pupils he gave public lessons again, out his enemies raised accusations egainst his *Introduction to Theoogy*, in which he attempted to solve new the doctrine of the Trinity. he council held at Soissons in 1121 rdered this work to be burned. belard retired again to St. Denis, here he irritated the monks by eclaring that the monastery had not en founded, as was commonly ought, by St. Dionysius of Athens, e areopagist converted by St. Paul. e was driven by persecution from Denis, and founded a small oratory de of wicker in the territory of oyes, but so many pupils flocked to him that it was soon rebuilt stone; this was called the Paracle or Comforter. But persecution fo lowed him here, and he left become superior in the Abbey of S Gildas of Ruys, near Vannes i Brittany. Meanwhile an abbot ha claimed Argenteuil, and Héloïse an her nuns were forced to leave it. They were estab. at the Paraclete, Abelard, after an absence of 11 years, officiating in the consecration. Bernard, abbot of Clairvaux, objected to the form of prayer used by Héloïse, but Abelard defended her. Bernard appealed to the council of Sens in Champagne in 1140, at which Abelard defended himself, but was condemned; he appealed to the pope, but the pope confirmed the condemnation; Abelard set out for Rome, but Peter the Venerable of Cluni persuaded him to stay with him and influenced Pope Innocent II. to suspend the sentence. Abelard moved for his health to St. Marcel near Châlon. He was buried at Cluni, but his remains were removed to the Paraclete; Héloïse lived twenty years after him, and at her death was laid by her own request at the side of Abelard. In 1497 their ashes were moved to the abbey; in 1800 to the garden of the Musée Française at Paris, and in 1817 to the cemetery of Père la Chaise. After his first fall Abelard seems to have become sensual, as his letters show; and after his mutilation his affection waned; Héloïse was always devoted till his death. His philosophy, as in *Nosce Teipsum*, often approaches modern rationalism. His *Sic et Non*, showing discrepancies in the writings of the fathers, was singularly bold for that time of religious intolerance. He opposed both nominalism (*q.v.*) and realism. *See* Life, and a philosophic drama, *Abelard*, by Rémusat (Paris, 1845 and 1877); Works edited by Victor Cousin, 1836. Correspondence between Héloïse and Abelard has been pub.; *vide* Pope's *Epistle of Eloisa to Abelard*; *Peter Abelard*, by J. McCabe, 1901.

Abele Tree, the Eng. name of the *Populus alba*, or poplar. *See* POPLAR.

Abelin, Johann Philipp (*d. c.* 1646), Ger. historian, better known under his pseudonym of Johann Ludwig Gottfried, was *b.* at Strasburg. His writings all pub. at Frankfort, include *Theatrum Europæum*, 1662–1738; *Historiarum Orientalis Indiæ*, 1628; *Inventarium Suecica*, 1632; *Historia Antipodum*, 1655.

Abencerrages, name of a noble family in the Moorish kingdom of Granada, the story of whose long struggle with the rival family of the Zegris has been the theme of many

Spanish chroniclers and romance writers. *See* MOORS IN SPAIN.

Aben-Ezra (1119–74), a celebrated Jewish scholar, *b.* at Toledo. He lectured and pub. works on philosophy, grammar, medicine, mathematics, and astronomy, and in connection with the last-named science gave his name to a star. He is chiefly known for his great commentary on the O.T.

Abensberg, Ger. tn. in Bavaria on the Abens, a trib. of Danube; noted for sulphur baths. A. is the Castra Abusina of the Romans. Pop. 2260.

Abeokuta, a tn. in Southern Nigeria, capital of the prov. of the same name. Constituted in 1914, it having previously been the centre of a semi-independent native state. It was founded in 1825 by the inhabitants of many neighbouring villages to protect themselves from slave-hunters. The mud walls are 18 miles in length and the tn. consists mainly of mud houses. It is a busy trading centre and exports timber, palm oil, yams, etc. The numerous Christian converts form an influential part of the population. In 1917 a rising occurred in the prov. caused by taxation. Pop. of tn. 38,034, of prov. 545,000.

Aber, a Celtic word, meaning mouth of river,' which forms the prefix of many names of places in Great Britain.

Aber, name of small vil. in Carnarvon, Wales. Pop. 400.

Aberavon, a seaport near the mouth of the Avon in Glamorgan, S. Wales. It is noted for its copper, iron, and steel works, has a good harbour, and is one of the parl. bors. of Swansea. It is now merged into the municipal borough of Port Talbot. Pop. 15,370.

Aberayron, small watering-place in Cardigan, Wales. Pop. 1537

Aberbrothock, *see* ARBROATH.

Abercarn, tn. in Monmouthshire; collieries and iron-smelting industry. Pop. 20,122.

Aberchirder, tn. in Banffshire, Scotland. Pop. 953.

Abercorn, a place in N. Rhodesia near the southern end of Lake Tanganyika. On Nov. 14, 1918, the German troops surrendered to the British here.

Abercorn, *see* HAMILTON.

Abercrombie, John (1726–1806), a writer on horticult. subjects, employed at Kew Gardens. In 1767 he pub. *Every Man his own Gardener*, which is said to have been submitted to Goldsmith for purposes of revision and returned without any alteration.

Abercrombie, John (1780–1844), eminent Sc[illegible] Aberdeen; [illegible] and rapidly became one of the foremost men in his profession. Was appointed physician in ordinary to the king in Scotland, 1824, and elected lord rector of Marischal College, Aberdeen, 1836. In addition to many medical treatises he was the author of two works that had considerable vogue at the time. These were *Inquiries Concerning the Intellectual Powers*, and *The Philosophy of the Moral Feeling*, in which he sought to harmonise the facts of science with the revelations of religion.

Abercromby, Lord Alexander (1745–95), judge and essayist; studied at Edinburgh. Was first sheriff-depute of Clackmannanshire, 1768–80, then sat on Court of Session bench, 1792. Appointed one of the lords-commissioners of justiciary, and was contributor to the *Mirror* and the *Lounger*.

Abercromby, David (*d.* 1701–2), a Scottish physician and metaphysician of the seventeenth century, of whose life little is known save what he himself has told in his book, *Protestancy to be Embraced*. Was educated as a Roman Catholic, and lived for eighteen years with a Fr. Jesuit order, but finally embraced the Protestant faith.

Abercromby, Patrick (1656–1716), antiquary and historian, was physician to James II., 1685. Was a Jacobite, and opposed to the union of Scotland with England, his chief work being *Martial Achievements of the Scots Nation*.

Abercromby, Sir Ralph (1734–1801), general, *b.* at Men[illegible] shire, educated at [illegible] law at Edinburgh [illegible] presented Clackmannanshire in parliament for a while. [illegible] the Duke of York [illegible] trous campaigns [illegible] Holland (1793 an[illegible] skill and humanity gained the affection and admiration of the whole army. This humanity led to his removal from the post of commander in Ireland during the rebellion of 1797 to a similar post in Scotland. He was wounded during an engagement with the Fr. at Alexandria, Egypt, and though victorious, died a week later.

Aberdare, a tn. Glamorgan, S. Wales. It is situated on an important coalfield, has extensive coal and iron works, and is in direct communication with the large ports in S. Wales, whence its coal and iron goods are exported. Pop. 55,007.

Aberdare, Baron, Henry Austin Bruce, first baron (1815–95), statesman. Stipendiary magistrate for Merthyr Tydvil and Aberdare from

1847 till 1852, when he entered parliament as representative of the same dist. as a Liberal. Held many high appointments, including the Home Secretaryship, 1869–73, and the Presidency of the Council, 1873–4. In the former capacity he conducted the reform of the licence laws. Was the first chancellor of the University of Wales, 1894.

Aberdeen: 1. An important city in the N. of Scotland, situated at the mouth of the R. Dee. In 1179 William the Lion granted it a charter, and it became a royal burgh, but in 1336 it was burned down. It was rebuilt as New Aberdeen, and soon became a flourishing tn. Being mostly built of granite it is a beautiful city, and amongst its buildings are the Municipal Buildings, the Market-Hall, the Art Gallery and School, the Royal Infirmary, the Lunatic Asylum, Trades-Hall, Marischal College, and Gordon's College. There are many churches and places of worship, of which the most important are the church of St. Nicholas and the Roman Catholic pro-cathedral. The statues and the Duthie Public Park are also famous. As a commercial and industrial tn. it plays a leading part, the value of its trade running into millions of pounds. Its harbour has been greatly improved by a pier of granite, and its chief industries are herring and salmon fishing, brewing, distilling, shipbuilding, paper-making, quarrying, and the manuf. of woollen, cotton, linen, and jute goods. In recent years the annual value of the fish landed has exceeded £2,000,000. As mine-sweepers and patrols the Aberdeen trawlers did noble service during the Great War. King George opened the city's war memorial in 1925. It has a disadvantage in not being within easy reach of coal and iron. It trades chiefly with Great Britain, America, the E. Indies, the W. Indies, and the Baltic and Mediterranean ports. It is a university city. King's College was founded in 1494 at Old Aberdeen by Bishop Elphinstone, and Marischal College was founded in 1593 by George Keith, Earl Marischal. Celebrated people connected with Aberdeen are Barbour, whose tomb is in the cathedral, and who was archdeacon of Aberdeen from about 1356 until his death; Hector Boece, prin. of King's College; George Campbell, prin. of Marischal College; and Byron, who received his early education at the Grammar School. Pop. 158,963. 2. Cap. Monroe co., Miss., U.S.A.; manufs. bricks and machinery; exports cotton seed. Pop. 13,925. 3. Cap. Brown co., S. Dakota, U.S.A; manufs. chemicals. Pop. 10,753. 4. Tn. in Chehalis co., Washington; has saw-mills and machine shops. Pop. 13,660.

Aberdeen, George Hamilton Gordon, fourth Earl of (1784–1860), statesman and prime minister of England. Educated at Harrow and Cambridge, and in 1801, on succeeding to the earldom, travelled in Greece; hence Byron's oft-quoted line, 'The travelled thane, Athenian Aberdeen.' Ambas. at Vienna (1813), and signed the treaty of Töplitz. Entered political life as a Tory, and became successively Chancellor of the Duchy and Foreign Secretary in Wellington's cabinet (1828–30), but although he held office (Colonies and War) under Peel (1834–5) and was again Foreign Secretary (1841–6), he gradually



LORD ABERDEEN

abandoned his high Tory principles and resigned with Peel in 1846. In 1852 succeeded Lord Derby as prime minister, forming a popular 'coalition ministry.' His ministry soon met with disfavour owing to the mismanagement of the Crimean war, and he resigned after the carrying in the House of Commons of Mr. Roebuck's motion of censure.

Aberdeen, Sir John Campbell Gordon, first Marquis and seventh Earl of, grandson of fourth earl, *b.* 1847, and has twice been lord-lieutenant of Ireland (1886 and 1905–15), and governor-general of Canada 1893–8. Marquisate created Jan. 4, 1916.

[illegible] the northern [illegible] lth an area of [illegible] coast-line is [illegible] are points

and headlands towards the N.E., of which Buchan-ness is the most easterly point of Scotland. Further N. there are high rocks and caves. In the S.W. the co. is bounded by the Grampians, which in their highest peaks rise to over 4000 ft. Cairngorm Ben Macdhui, Cairntoul, and Lochnagar are the prin. points. The surface is generally hilly, and is watered by the Rs. Dee (87 m.), Don, with its trib. the Urie (82 m.), Ythan (36 m.), Deveron (50 m.), and the Ugie with their various tribs. The soil on the whole is not fertile except in that portion between the Rs. Don and Ythan, but owing to the industry of the people crops of barley, oats, and turnips are produced. Much of the land is covered with fir, ash, birch, and poplar trees, and in some parts sheep and cattle are reared. Herring and salmon fishing is a great industry, especially at Peterhead and Aberdeen. The co. is divided into five divs., Mar, Formatin, Strathbogie, Buchan, and Garioch; and the most important tns. are Aberdeen, Peterhead, Fraserburgh, Inverury, Kintore, Charlestown, Old Meldrum, Huntly, and Turriff. There are many small vils.—Ballater, Boddam, Newburgh, Newlyth, and Strichen. The ruins of old feudal castles still exist, among which may be noted Dundargue, Ken-Edgar, Craigston, Fedderessett, Slains, and Fyvie. Balmoral is noted for its castle. The co. returns two members to parliament. Pop. 301,016.

Aberdovey, a seaside resort in the urban district of Towyn in Merionethshire, Wales, on the estuary of the Dovey, about 10 m. N. of Aberystwith, on the Great Western Railway. Pop. of Urb. dist. 4413, of tn. 1253.

Aberfeldy, a vil. on the r. b. of the R. Tay in Perthshire. Pop. 1560.

Aberfoyle, a vil. on the R. Forth in erthshire; the scene of Scott's *Rob oy*. Pop. 1169.

Abergavenny, a tn. in Monmouthire, at the confluence of the Usk d Gavenny. It is an old Roman tlement (Gobannium); there are nains of an old castle and of a nedictine priory; and there still sts an old church and sev. places vorship. Coal and iron are found he vicinity, but it is chiefly noted wool market. Pop. 9010.

bergavenny, Baron, *see* NEVILLE.

bergeldie Castle, the Aberdeen- seat of the Prince of Wales, te on the R. Dee near Bal-l.

ergele, on the coast of Denbigh- N. Wales. It is an old Roman and Harold was defeated by rdd ap Llewelyn near there.

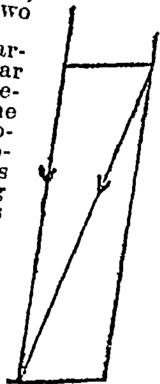
It is now noted as a seaside r Pop. 2631.

Abernethy, a vil. on the Tay, P shire. It was the anct. cap. of Picts, and possesses a round to the date of which is uncertain. 1282.

Abernethy, John (1680–1740), I Protestant divine. By his refusa accept the synod's decision that should go to Dublin (1717) he caus a division in the Irish Presbyteri Church, the two parties becomi known as 'subscribers,' and 'no subscribers.' Ultimately he went Dublin (1830), where he engaged many theological controversies, an strongly opposed the Test Act.

Abernethy, John (1764?–1831), celebrated surgeon, grandson of Irish Presbyterian clergyman (*supra*). Place and date of birth doubtful, probably Derry in Ireland. Educated in Wolverhampton, he was appointed assistant-surgeon at St. Bartholomew's Hospital, 1787. Full surgeon from 1815 to 1827, during which period he gained a wide reputation for his daring and skilful conduct of operations for the cure of aneurism. He pub. many medical works, and laid down two important principles, which greatly influenced all subsequent surgical practice, the first being that local diseases had a constitutional origin, and the second that this origin could generally be traced to disorders of the digestive system. His reputation, however, rests mainly on his power as a lecturer, and he was easily the most popular medical teacher of his day.

Aberration, a deviation; in biology, an abnormal structure or departure from the type. In optics, the term is used in two different senses.



A. of Light, the apparent deviation of a star from its path, a phenomenon depending upon the relation between the velocity of light and the velocity of the earth in its orbit. A man walking with an umbrella provides what is perhaps the best illustration. If he wishes to shelter himself from vertically descending rain, he has to hold the umbrella before him at an angle which varies with his own pace and also with the downward speed of the rain. If his own rate is slow and the rain is descending swiftly, the umbrella is held fairly upright, but a brisk walk through slowly-falling rain necessitates inclining the umbrella well to the front. Now consider

the case of an observer looking at a star through a telescope. The rays of light come from the star with a velocity of 186,330 m. a second, whilst the observer himself with his telescope is travelling along the earth's orbit. In order to catch the rays proceeding from the star in the telescope tube, the instrument has to be tilted away from the direction of the light, just as the umbrella has to be inclined away from the true direction of the rain. The slope of the telescope therefore indicates as the position of the star a point which is somewhat in advance of its true position. The path of the earth around the sun is elliptical, so that, in the course of a year, the successive points to which the telescope has been directed will be found to be on the circumference of a small ellipse, with the true position of the star as the point of intersection of the axes. The minor axis of this ellipse depends upon the latitude of the star, because if it be near the plane of the earth's orbit it will appear flattened out; but the major axis is the same for all stars and is found to be approximately 40″. This means that the maximum apparent deviation of the star from its true position is 20″ (more exactly, 20·45″) in each direction. As A. depends upon the ratio between the velocity of light and the velocity of the earth, the determination of this 'constant of A.' provides a method of calculating one of these velocities if the other be known.

A. in Optics—Chromatic A.—When ordinary white light passes through a lens with thin edges, the violet rays are most refracted, and tend to come to a focus before the red rays. If a screen be placed so as to intercept the rays, in one position the image will be found to have a red border, owing to the red rays not yet having converged; whilst on moving the screen a little further from the lens, the border becomes violet, because the violet rays are now diverging again. A. of this kind, called chromatic (Greek, *chroma*, colour), interferes with the usefulness of optical instruments. It may be remedied by coupling two lenses made of different glass, so that the difference in refracting power may lead to an adjustment, bringing all the coloured rays to the same focus.

Spherical A.—Even when the light passing through a lens is monochromatic, the focussing is never quite exact. The image of a point is shown as a small circle, so that objects perceived are blurred in outline. This is not so serious a fault in lenses as chromatic A., and can be avoided to some extent by the use of diaphragms limiting the used area of the lens.

A. is also occasioned by mirrors of spherical form. A parabolic mirror, however, gives an exact focus, which is the reason why such mirrors are used when a parallel beam of light is required, the source of light in this case being placed at the focus.

Abershaw, Louis Jeremiah, or 'Jerry' (1773?–95), celebrated highwayman mentioned by Borrow in his *Lavengro* as Jemmy Abershaw. For some years he was the terror of the roads between London and Kingston, but he was finally hanged on Kennington Common.

Abersychan, a tn. Monmouthshire. Its position near a large coalfield makes it a centre for iron and steel works. Pop. tn. and par. 27,097.

Abertillery, a tn. Monmouthshire, noted for its collieries and tin-plate works; pop. par. 27,855, urb. dist. 38,806.

Aberystwith, a tn. near the mouth of the R. Ystwith, Cardiganshire, Wales. The people are engaged in fishing, and the manuf. of woollen goods and machinery. It is the seat of the University College of Wales, and is a great bathing place. Edward I. built a castle there, and the remains of Owen Glendower's dwelling still exist. Taliesin, the poet, is supposed to have been buried there. Pop. 11,211.

Abeshr, cap. of Central Sudan, on the caravan route from Khartoum to Kuka; pop. about 25,000.

Abettor, a term used both in a legal and general sense, indicates a person who instigates or encourages an offence, without taking any active part in it. *See also* ACCESSORY and ACCOMPLICE.

Abeyance, a legal term derived from the Fr. *bayer*, to expect. The term is used to imply the state of suspense of the rights in a freehold or a title of honour. It is a maxim of English law that freehold cannot be put in A. by any action of the owner, the underlying idea being that some person should be in existence for the discharge of feudal duties. Where, however, a life interest only exists in lands, such, for example, as is the case of a bishop, that interest is said to be in A. until the appointment of his successor. In the same way where a title can be held only by male heirs that title may be in A. if the persons next in inheritance to the last possessor are females. The title is not extinct, for the birth of a son to any of the female heirs can revive it. Personal property and right of a citizen to vote can in the United States be held in A.

Abgar, name of a line of rulers of

Edessa in Mesopotamia. They were 28 in number, the best known being the fourteenth. He it was who is said to have written to Jesus asking him to come and cure him of a disease. Eusebius of Cæsarea trans. this letter and the reply of Christ, promising to send a disciple after his ascension, from the Syriac to Greek, but their authenticity was discredited by Pope Gelasius in 494.

Abhorrers, the court party in the reign of Charles II. who were opposed to and 'abhorred' the views of the rival party, led by Shaftesbury, who were opponents to the royal prerogative. The former party were subsequently called 'Tories' and the latter 'Whigs.' *See also* TORY.

Abiathar, high priest in the reign of the Heb. kings, David and Solomon. Escaping from the massacre by Saul of the sons of Ahimelech (his father, also high priest) he joined David at the Cave of Adullam, and remained faithful to David during the life of the latter. He was deposed by King Solomon for his participation in the rebellion of Adonijah and banished.

Abib, or Nisan, formerly the first month in the Jewish calendar, but according to present day reckoning the seventh. Corresponds to April. In it is celebrated the feast of the Passover.

Abich, Wilhelm Hermann (1806–86), Ger. geologist and explorer. Travelled in the Caucasus, Armenia, and N. Persia. Pub. numerous works on meteorological and geological subjects, more especially treating of the countries above enumerated.

Abies, *see* FIR.

Abies, in fossil botany, is the name given to the *A. laricioides*, a single incomplete specimen of a fruit resembling the spruce fir (*A. excelsa*), by Brongniart. Its locality is unknown.

Abietineæ, a genus of the Coniferæ, with perfect cones, the seed hidden between scales, hard testa, and no aril. The cones are usually monœcious.

Abigail, the wife of Nabal, the churlish rich man who refused hospitality to King David when he had to flee his kingdom. Intercepted David when later he returned to punish her husband, and so won his heart that not only did he forego his chastisement of Nabal, but after the latter's death David took Abigail to wife. Another Abigail was the sister of David. The name *abigail* is used for a waiting-maid or female domestic from the style of 'handmaid' which Abigail used to designate herself when speaking to David.

Abijah, name of more than one Biblical character, of whom the chief was the son of King Rehoboam. He was engaged in war with and defeated Jeroboam, the other king of the then divided kingdom of Palestine.

Abilene, co. seat of Taylor co., Texas, U S.A., 160 m. W. of Fort Worth; has flour and planing mills, and deals in cotton.

Abimelech: (1) Name of two Philistine kings, father and son, who taking the wives of Abraham and Isaac to be their sisters married them. Both were restored to their former husbands with reparation on their true relationship being revealed. (2) Natural son of Gideon, the Heb. judge, who, by the murder of his seventy brothers (except the youngest, Jotham, who escaped), made himself king of Shechem. Jotham later appeared and propounded to the subjects of Abimelech the parable of the bramble-king, the first recorded Biblical parable. Abimelech was killed by a woman while besieging the rebel city of Thebes (Palestine).

Abingdon, a tn. in Berkshire, 6 m. S. of Oxford, situated at the confluence of the Ock and the Thames. Noted for its rich abbey, founded in the seventh century, of which the ruins remain, and for the fact that in the neighbouring village of Sunningwell, Roger Bacon made his astronomical observations. Till 1885 Abingdon was represented in parliament by a member. Carpet and clothing manufactories. Pop. 7165.

Abingdon, the co. seat of Washington co., Va., U.S.A., near Walker's Mt., on the Norfolk and Western Railroad. It has sev. educational institutions—the Martha Washington College, 1858, and Stonewall Jackson Institute, 1869 (both for women), and Abindgon Academy. There are manufs. of tobacco, bricks, and wagons; flour and planing mills, and trade in live stock. Pop. 2877.

Abinger, Baron, Sir James Scarlett (1769–1844), Eng. politician and judge *b.* in Jamaica, studied in the Inner Temple, and called to the bar in 1791. In 1794 entered parliament as Whig member of Peterborough, was knighted and appointed attorney-general in Canning's ministry (1827), and in Wellington's (1829–30). Successfully carried through a Bill to amend the administration of justice (1830), but opposed the Reform Bill of 1831. Was returned as a Tory for Cockermouth (1831), and then Norwich (1832), and was elevated to the bench by Peel (1834) as lord chief baron of the Court of Exchequer.

Abington, *see* HABINGTON.

Abington (or Habington), Edward (1553–86), a conspirator in the Catholic plot of Babington against Queen Elizabeth. Although protesting his innocence, he was sent to

the Tower and hanged and quartered, Sept. 20, 1586.

Abington, Mrs. Fanny (1737–1815), celebrated actress, b. in London. Début at Haymarket, 1755, as Miranda in 'Busybody.' Created [illegible] including [illegible] ersonated [illegible] ines. [illegible] Thomas [illegible] Edward (*supra*), and like him imprisoned for complicity in Babington's plot, 1586. The letter to Monteagle warning him of the Gunpowder Plot is attributed to Abington's wife.

Abiogenesis, the supposed production of living from non-living matter. The more popular term is spontaneous generation, and under this name the possibility of the phenomenon was generally believed in until recent times. The ancients supposed that bees and flies were generated in putrefying carcases, and that mud and filth brought forth such creatures as eels, frogs, and mice. The growing knowledge of the life history of those animals gradually dispelled the belief, but at a later period it was held that the bacteria of fermentation and putrefaction owed their origin wholly to the substances in which they were found. Pasteur was to a great extent responsible for the conclusion that if a substance has been sterilised, only infection from outside sources can re-introduce bacteria. Complete sterilisation, however, is difficult to obtain, for some bacteria survive the temperature of boiling; and the presence of germs, too, is so widespread and their multiplication so rapid that it is difficult to establish a direct refutation of the theory. The mere fact that the earth must have been at one time a molten mass of inorganic matter is sufficient to encourage many in the belief that it may yet be possible to product life *de novo*.

Abipones, formerly a fine race of S. American Indians inhabiting Paraguay who by their courage pr[illegible] opponents to [illegible] .ncorporated wi[illegible]

[illegible] nephew, a man of great courage and prowess in battle. Accompanied David on the night expedition to camp of Saul (1 Sam. xxvi. 6–9). On one occasion with two others he broke through the Philistine ranks, and on another slew 300 men. Was faithful to David during Absalom's revolt. *See* CHRONICLES and SAMUEL *passim*.

Abjuration of the Realm. By the old common law of England if a person accused of any crime other than treason or sacrilege took sanctuary in a parish church or churchyard, and within forty days went in sackcloth to the coroner and confessed his guilt, he was allowed to take the oath of abjuration of the realm, *i.e.* he would leave the country forthwith and never return without licence from the king. All his property was forfeited, and the penalty for returning without leave was hanging. By a statute of Elizabeth (35 Eliz. c. 2), Roman Catholics and Dissenters might be required to abjure the realm. The privilege of sanctuary was abolished in the reign of James I.

Abjuration, Oath of. An oath taken by holders of public office, such as members of parliament, clerics, and lawyers, originally imposed in the reign of William III., and requiring the taker of the oath (juror) to abjure the claims of the Stuart Pretender or his heirs to the throne. It also rejected the opinion that the Pope of Rome had any jurisdiction in England, or that princes excommunicated by him could be deposed or murdered. After many modifications with a view to relieving Jews, Catholics, etc., the various statutes were consolidated in the Promissory Oaths Act, 1868. The famous Bradlaugh case (*q.v.*) arose from Bradlaugh's objection to the final wording of the oath, 'so help me God.'

Abkhasia, or Abasia, a Soviet republic of Georgia comprising about 2500 sq. m. on the southern slope of the Caucasus. Successively under Persian, Georgian and Turkish control, it was annexed by Russia in 1809, but not pacified till 1864. The people are occupied in agriculture, cattle-raising and lumbering. The principal town is Sukkum Kale. Pop. (1917) 136,500.

Ablancourt, Nicolas Perrot D' (1606–64), Fr. translator of Greek and Roman writers. He trans. the whole of Tacitus and four of Cicero's orations, but his versions, being somewhat paraphrastic, have long been superseded.

Ablative Case, *see* DECLENSION.

Ablaut is a Ger. term used by philologists to signify a relation existing between the vowels of certain series of related words in Indo-European languages, caused by the Indo-European system of accentuation. It is most clearly shown in the strong verbs, where it is still to be found in modern Eng. The relation of *i*, *a*, *u* in the verb *drink*, *drank*, *drunk* is an A. relation, the vowels themselves forming an A. series.

Able-bodied Seaman (A.B.). In the R.N. a youth about 18 signs on for 12 years, and, having some know-

ledge of gunnery, becomes an A.B. In the Merchant Service, the term is used for any man who has had 2 years' experience before the mast.

Ablution, or Purification, a rite of the anct. Jewish and other churches by which the purification of the soul was symbolised by the washing of the body. The Mosaic law has a very elaborate code of rules for this ceremony. The term is also used to indicate the washing of the chalice and the priest's hands after mass.

Abner, a cousin of the Heb. king, Saul, and captain of his army. After the death of Saul he proclaimed Ishbosheth king. Seeking to reconcile the rival claims of Ishbosheth and David, he visited the latter at Hebron, where, to David's great sorrow, he was treacherously slain by David's captains, Abishai and Joab.

Abney, Sir Thomas (1640–1722), one of the original promoters and directors of the Bank of England. Benefactor of St. Thomas's Hospital; lord mayor of London, 1700–1.

Abney, Sir William de Wiveleslie (1844–1921), Eng. physicist and astronomer; *b.* in Derby, educated Royal Military Academy, Woolwich. Captain in Royal Engineers, 1873; president, Royal Astronomical Society, 1893–5; president, Physical Society, 1895–7; prin. assistant secretary Board of Education (Science Dept.), 1899–1903. Thenceforward adviser to the Board of Education and to the War Office. Pub. important works on photography, especially stellar photography, and wrote valuable treatises on spectroscopy. *Instruction in Photography*, 1876; *Treatise on Photography*, 1875; *Colour Vision*, 1895; *Researches in Colour Vision and the Trichromatic Theory*, 1913. He also wrote *Thebes and its Five Great Temples* (1876), and with C. D. Cunningham *The Pioneers of the Alps*, 1887.

Abo, important tn. in Finland, and formerly cap., situated on the Aura-joki R. not far from its mouth. Its university, founded in 1640, was removed to the present cap., Helsingfors, after the disastrous fire which destroyed its buildings and most of the tn. in 1827. Important shipbuilding and timber trade. Pop. 60,412.

Abo, tn. in W. Africa at head of Niger Delta. Palm oil largely exported. In 1930 A. (and also Opobo) was the scene of rioting, in which native women took a leading part, the cause of the unrest being the uneconomic prices obtained for palm kernels. In the restoration of order, more than a score of women were killed by the rifle fire of native police. Pop. 8000.

Abolitionists, name of party in the United States who demanded the abolition of slavery. Although many individuals had held opinions hostile to slavery, especially among the Quakers, it was not until 1774 that Benjamin Franklin presided over their first congress in Philadelphia. Towards the end of the third decade of the nineteenth century the movement against slavery began to make great headway, and in 1831 one of its chief leaders, William Lloyd Garrison (*q.v.*), began to pub. its organ, the *Liberator*, in Boston. The New England Anti-Slavery Society, formed in 1832, became the nucleus of a great political party which influenced and finally (1856) merged with the republican party. The feeling against the A. was naturally very strong in the S. or slave-owning states, the legislature of Georgia even going the length of offering a reward of 5000 dols. to any one who could secure the conviction of Garrison. Even in his own city of Boston, Garrison was severely handled by the mob. No doubt much of the unpopularity incurred by the A. was due to the practical assistance rendered to runaway slaves by an organisation called the 'Underground Railway.' The A. ideals finally triumphed when President Lincoln proclaimed the freedom of the slaves on January 1, 1863.

Abomy, a walled city, formerly the cap. of Dahomey, the negro kingdom of W. Africa, about 70 m. from the present cap., Porto Nova. It was occupied by the Fr. when they conquered Dahomey in 1892. Has an extensive trade in palm oil, gold, and ivory. Pop. 15,000.

Aborigines, formerly the name given by Greek and Roman writers, who treated of the earliest period of Roman history, to a tribe who occupied, with their allies the Pelasgi, the dis. of Latinum. Now used to denote the original inhab. of any country, and more particularly the natives found in a country conquered or colonised by Europeans. The term is also used to denote the original fauna and flora of a place. The Aborigines Protection Society, founded in 1833, has been instrumental in securing the framing of regulations designed to secure the natives of British and other colonies from ill-usage by white officials or colonists. In 1872 and 1875 acts were passed for the protection of the Pacific islanders, more especially in relation to their importation as labourers into the Australian colonies. The dominion of Canada has exclusive control over its aboriginal tribes, but for other colonies special pro-

tection is afforded the natives by the imperial gov. In 1890 the General Act of the Brussels Conference was signed, by which the adhering powers agreed to certain restrictive measures concerning the sale of drink to natives, etc.

Abors, savage race of hillsmen inhabiting the hinterland of Burma, against whom a punitive expedition was despatched by the Indian gov. in 1911 to avenge the death at their hands of Mr. Williamson, an Anglo-Indian official.

Abortion (*Aboriri*, to fail to be born), the premature expulsion of the fœtus from the womb before the seventh month. Later, such an occurrence is called premature labour. The term A., however, is often restricted to cases where such expulsion is deliberately contrived; either by doctors as a measure calculated to save the mother from death or serious illness, or by evil-disposed persons to evade the responsibilities, or perhaps (in the case of illegitimacy) the shame, of motherhood. Cases of A. due to accidental or pathological causes are frequently known simply as miscarriages.

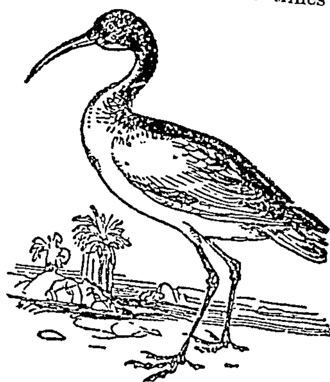
The expulsion of the fœtus is by no means rare, and may be the result of a salutary effort of nature to get rid of diseased matter within the womb, or may be due to preventable causes. The malformed or diseased condition of the womb may lead to the death of the fœtus, when any further association with the mother is fraught with grave dangers to her health. In this case the body makes its own preparations for getting rid of the dead matter and miscarriage takes place. Abnormal excitement during pregnancy, sudden shock, a fall, over-reaching, or over-straining are all liable to cause A., and should therefore be avoided by a woman about to become a mother. In general it may be said that in the upper classes persistence in the more exciting forms of society pleasures provides a cause; whilst among women of the labouring classes the necessity for somewhat severe manual work is frequently responsible for miscarriage.

The symptoms comprise pains in the loins and a sense of bearing down, accompanied by a discharge of blood. The discharge, if continued, results in the expulsion of the fœtus, and it is advisable that the matter discharged should be kept for examination by a medical man, as the treatment depends upon the possibility of preventing the miscarriage altogether. The patient should be kept quiet in a recumbent position, and the abdomen kept cool. If it be impossible to prevent the occurrence the treatment then aims at bringing about the expulsion as quickly as possible, and with a minimum amount of derangement.

A. has naturally a weakening effect upon the system, and complete rest for some time is imperative. One of the most important after-effects is the liability to the establishment of a 'habit'; that is to say, a miscarriage may take place in a subsequent pregnancy at the corresponding period. In this connection it may be noted that tendency to miscarriage is often aided by what would be in point of time the menstrual period.

The procuring of A. by a pregnant woman, by taking drugs or using instruments, is a felony, and any person who endeavours to procure the miscarriage of any woman by administering drugs, or using any instrument or other means with the same object, is guilty of a felony. The penalty is penal servitude for life or not less than 3 years, or imprisonment not exceeding 2 years with or without hard labour. To supply or procure drugs or instruments, knowing that they are to be used with the object of procuring a miscarriage, is a misdemeanour. The penalty in this case is penal servitude not exceeding 5 nor less than 3 years, or imprisonment not exceeding 2 years with or without hard labour.

Abou-hannes (*Ibis religiosa*, Cuvier; *Tantalus Æthiopicus*, Latham), an Egyptian word meaning Father John, is a bird which in anct. times was regarded with great veneration by the Egyptians. It is no doubt the White or Sacred Ibis mentioned by Herodotus (ii. 76).



ABOU-HANNES

Abou-harb, the Arabic name of the Leucoryx antelope.

Abou-hossein, the Arabic name of a species of fox (*Canis pallidus*), found in Darfur and Kordofan. Rüppel, *Zool. Atlas*.

Aboukir, a vil. on Aboukir Bay, 13 m. N.E. of Alexandria, Egypt. Its historical connections make it famous. The battle of the Nile was fought in Aboukir Bay, 1798, when the Fr. were completely defeated by Nelson. In 1799 Napoleon defeated the Turks with an army of 18,000 men there, and in 1801 Sir Ralph Abercrombie defeated the Fr.

Abousambul, Abu Simbel, or Ebsambul, *see* IPSAMBUL.

Abou-schom, the Arabic name of a species of fox (*Canis variegatus*), found in Nubia and Upper Egypt. It does not burrow, but resides among rocks. Rüppel, *Zool. Atlas*, p. 31.

About, Edmond François Valentin (1828–85), a distinguished Fr. author, was *b.* at Dieuze, Lorraine, and educated at the École Normale, Paris, and at Athens. In 1854 he wrote *La Grèce Contemporaine*, which was a great success, and *Tolla*, a novel. Then followed *Les Mariages de Paris*, and by this time his reputation was estab. His other works are: *Le Roi des Montagnes*, 1856; *Germaine*, 1857; *Madelon*, 1863; *La Question romaine*, *Le Nez d'un Notaire*, 1862; *L'Homme à l'Oreille Cassée*, 1862; *Le Cas de M. Guérin*, 1862, three fantastic tales; *Trente et Quarante*, 1865; *L'Infâme*, 1867; *Le Progrès*, a study of social reforms; *Le Turco; Les Mariages de Province*, 1868; and *Le Roman d'un Brave Homme*, 1880. He contributed to the journals and founded *Le XIX^e Siècle* in 1871, and wrote political pamphlets. As a dramatist, however, he was not successful, although he wrote *Gaëtana* and *Guillery*, a comedy. He was elected a member of the Fr. Academy, 1884.

Abracadabra, a magical word, written in the form of a triangle, and used by ancients as a spell to overthrow evil spirits, to cure fever

A B R A C A D A B R A
A B R A C A D A B R
A B R A C A D A B
A B R A C A D A
A B R A C A D
A B R A C A
A B R A C
A B R A
A B R
A B
A

and other maladies. According to Serenus Sammonicus, a doctor and poet, at the commencement of the third century, the letters of the word must be written in the form of a triangle so that it can be read in different ways. It was often written on a piece of paper, folded, and worn round the neck.

Abraham, the great patriarch of the Hebrew race with whom the history of Israel begins. Born in Ur of the Chaldees, the son of Terah, an idolator (Joshua xxiv. 2), he set out with his father, his wife, Sarai, who was also his half-sister (Gen. xx. 12), and Lot his nephew, and settled for a time in Haran, where Terah *d.* (Gen. xi. 31). Thence, at the call of God, he went into Canaan, taking his wife and nephew, with his household and property (Gen. xii. 1). At Shechem Abraham first received the promise of the land. There he built an altar to the Lord; a second he built at Bethel, as he journeyed S. (Gen. xii. 7–9). Dearth in Canaan drove Abraham to Egypt, where, calling Sarai his sister, he brought her into grave danger. God protected her, and Abraham returned to Canaan with the reproach of Pharaoh, whom he had deceived (Gen. xii. 10; xiii. 1). Abraham and Lot separated at Bethel, and Abraham moved to Hebron (Gen. xiii.). He defeated Chedorlaomer, who had taken much plunder and many prisoners, including Lot, and both booty and captives were rescued. Melchizedek, king of Salem, met Abraham, and blessed him. Abraham, now an old man and childless, doubted the promise to his seed, but God renewed the promise (Gen. xv.). His first son Ishmael was born to him by Hagar, the Egyptian maid (Gen. xvi. 1). In his hundredth year, God changed the name of Abram, 'exalted father,' to Abraham, signifying that he would be the father of many nations (Gen. xvii. 5), and in her ninetieth year Sarai's name was changed to Sarah, and she was assured of a son, whereat Abraham, incredulous, laughed. This suggested the son's bame Isaac, from the Heb. verb 'to laugh.' When Abraham was told by the Lord of the impending destruction of Sodom, he interceded, and going up to the scene of the intercession, he saw the smoke of the burning cities ascending like that of a mighty furnace (Gen. xix. 27). At the appointed time Isaac was *b.* (Gen. xxi. 1), and Ishmael and his mother were driven away (Gen. xxi. 8). At Beersheba an alliance was arranged between Abraham and Abimelech, the Philistine king (Gen. xxi. 22). While sojourning in the Philistine country, Abraham's faith endured its sternest test by the command to slay in sacrifice his son Isaac (Gen. xxii.). Sarah *d.*, and Abraham bought the Cave of Mach-

pelah as a burying-place; and realising his approaching end sent for Rebekah as a wife for Isaac (Gen. xxiv.). Abraham's second wife was Keturah, by whom he had six sons (Gen. xxv. 1). At the age of 175 he *d.*, and was buried by Isaac and Ishmael in the Cave of Machpelah (Gen. xxv.). Abraham is known as 'The Friend of God,' and ranks not only as the great ancestor of many peoples, but as the 'prophet' (Gen. xx. 7) through whom the revelation was begun; as the founder of that religion which was to gather all nations within its scope.

Abraham, Plains of, or Heights of, near Quebec, Canada. Here was fought the battle of the Heights of Abraham, 1759, between the Fr. under Montcalm, and the Eng. under Wolfe. The Fr. were defeated and Canada became a British possession.

Abraham-a-Santa-Clara (1644–1709), whose real name was Ulrich Megerle, was *b.* near Möskirch, Swabia, Germany, and *d.* at Vienna. He was a very popular Ger. preacher, joined the Augustinians, became court preacher at Vienna, went to Graz, but afterwards returned to Vienna. His sermons are full of imagination, but nevertheless contain sound doctrine. Schiller's *Wallenstein's Lager* is modelled on his sermon, 'Up, up, ye Christians!'

Abrahamites, a sect of Syrian heretics, said to be allied to the Paulicians, who denied the divinity of Christ. Their founder was Ibrahim, or Abraham, of Antioch.

Abrahamites, a sect of Bohemian deists, who claimed the original religion of Abraham. They denied the Trinity, and accepted from the Bible only the Ten Commandments and the Lord's Prayer, declaring themselves followers of John Huss. Joseph II. transported them to Transylvania in 1783.

Abraham-men, a cant term used [illegible] dered about the [illegible] sted from the [illegible] and in order to excite pity or fear appeared to be lunatics, dressed themselves in rags, and made themselves appear ridiculous. They called themselves 'Poor Tom,' and when caught pilfering claimed to be 'Tom o' Bedlam.' (*See* Dekker's *Bel-Man of London.*) From this we get the terms 'Abram cove' and 'to sham Abraham.'



ON THE PLAINS OF ABRAHAM

Abraham's Bosom, a metaphorical expression to denote the abode of bliss for the soul after death, used by Christ in the parable of the Rich Man and Lazarus. At the time of Christ it was the custom for the Jews to recline on couches during meals, so that necessarily the head of each guest lay towards the breast of his neighbour, and the expression was derived from this custom as denoting absolute repose.

Abranchiata (from Gk. ἀ, without, βράγχια, gills), several different groups of animals which either have no gills or have them hidden. Among vertebrates it distinguishes mammiferous animals, birds, and reptiles from fish and amphibious animals.

Abrantes, a tn. near the banks of the Tagus, in Estremadura, Portugal. It was taken by Junot in 1807, and

is strongly fortified. It trades in corn, oil, and fruits. Pop. 7215.

Abrasives (from Latin *ab*, away, *radere*, to scratch), mineral substances used for polishing and grinding, *e.g.* emery, sand, pumice, grindstone, millstones, corundum, rouge, and garnet.

Abraxas, a name devised by the heretic Basilides, containing those Greek letters which, according to the numeral system then in use, stood for 365, and expressing the all-pervading spirits of the universe. The word was engraved on gems among the ancients, and the term is also used for a stone or gem thus engraved.

Abrazite, *see* PHILLIPSITE.

Abrogation: (1) In canon law the annulling of any previous law either by decree or disuse. (2) In Eng. law the reversion or repeal by a higher legislative authority of the order of a subordinate court.

Abrus, a genus of shrubs of sub-order Papilionaceæ of order Leguminosæ, growing in Egypt and India. *A. precatorius*, wild liquorice, is a W. Indian plant, the seeds of which are scarlet tipped with black. They are used as weights, and are strung together into necklaces and rosaries, whence they obtain the name of 'prayer-beads.'

Abruzzi, Luigi Amadeo Giuseppe Maria Ferdinando Francesco di Savoia-Aosta, duca di, son of Amadeo, Duke of Aosta, was *b.* at Madrid on Jan. 29, 1873. He ascended Mt. St. Elias, in Alaska, in 1897; beat Nansen's record in his polar expedition of 1900; ascended highest peaks of the Ruwenzori Mts. in Central Africa, in 1906; Mt. Kenia in British E. Africa in 1909. He commanded an Italian squadron during the Tripolitan War of 1912 and sank the Turkish torpedo boats off Epirus. In 1913 he was made commander of the Italian navy, and assumed active command in 1915 when Italy intervened in the Great War, his navy comprising 4 dreadnoughts, 10 older battleships, and numerous smaller craft. He continued in command till 1917, when he retired through disagreement with his staff. He has pub. *La Spedizione al Monte Sant' Elia*, 1900, and *Il Ruwenzori*, 1908.

Abruzzi e Molise, a group of provinces of Southern Italy, including the central portion of the Apennines, area 5951 sq. m. The highest peaks are covered with snow for most of the year; they culminate in the Monti Sibillini (8130 ft.), the Gran Sasso d'Italia (9560 ft.) and the Maiella (9120 ft.) and abound in fine scenery. The valleys are fertile and watered by numerous streams flowing into the Adriatic. They produce corn, rice, oil, almonds and wine, and there are many flocks of sheep. The extensive woods have large herds of swine and the hams and sausages are famous. The coast on the Adriatic is flat and monotonous and there are no good harbours. There are no large towns. Pop. 1,399,980.

Absalom, the third son of David and Maacah, daughter of the king of Geshur, compassed the death of his brother Amnon, but was, after a long exile, pardoned by his father. He was able, ambitious, and much praised for his beauty. He provided a bodyguard for himself (*cf.* Pisistratus, Herodotus i. 59); and prepared the way for a revolt by cunningly cultivating the goodwill of the people. After four years he raised his standard at Hebron, and had great success. Even David of the lion-heart fled to Mahanaim beyond Jordan. In his revolt against David, Absalom was aided by Ahithophel; but Hushai, David's friend, joined Absalom to defeat the plan of Ahithophel. Ahithophel, seeing his counsel ignored, hanged himself. David sent a force to meet Absalom, who was routed in the Forest of Ephraim, caught by the head in the branches of a terebinth, and was slain by Joab, in spite of the king's order to 'deal gently' with him. David's lament for his son is one of the most pathetic in all history. *See* 2 Sam. iii. and xiii.–xviii.

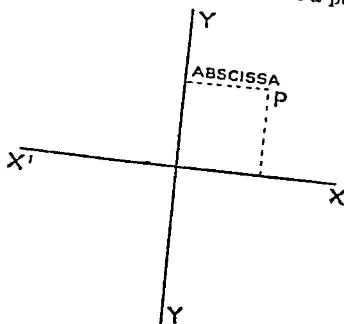
Absalom and Achitophel, title of a poetical satire by Dryden (1681).

Absalon, or Axel (1128–1201), was *b.* in the Is. of Seeland, Denmark, became archbishop of Lund (1178), and minister to Valdemar I. and Canute VI. of Denmark. He took an active part in helping with the legislation of Valdemar, and drove the Wendish pirates from the country. Under Canute he helped to overthrow Bogislav of Pomerania. Besides a great statesman and general, he was a lover of art and learning, assisting Saxo Grammaticus with his great history of Denmark. He built a castle which was the nucleus of the city of Copenhagen.

Abscess, a collection of pus or matter as the result of bacterial inflammation. When injurious germs gain access to any part of the human body, the white blood-corpuscles rush to engage in a struggle with the invaders. If the blood is not in good condition, the hostile germs are not quickly destroyed and multiply at a great rate. The contest then proceeds until there is formed a creamy mass of dead corpuscles and bacteria which is known as *pus*. This may be absorbed into the blood

stream by other corpuscles, but is more frequently discharged by the disintegration of the covering tissue. The usual treatment consists of promoting the discharge of pus by poulticing and lancing, or, in the case of a deep-seated A., by draining through a tube.

Abscissa, the distance of a point from some fixed line, measured horizontally. With rectangular co-ordinates, it is the distance of a point



from the Y or vertical axis measured parallel to the X or horizontal axis. *See* Co-ordinates.

Absconce (from Latin *abscondere*, to hide), a small lantern, of anct. origin, used in the Roman Catholic Church, during the performance of the night offices.

Absentee, a term applied to one who receives rent from an estate which he spends in another country. Also sometimes applied to one who draws a salary from an office without performing its duties. The effect of absenteeism is two-fold, moral and economic. With regard to the former there can be very little doubt that the introduction of middle-men, or agents, tends to lessen the sense that property-owners have obligations as well as privileges. Also the property-owner by absence loses that ersonal touch between owner and enant which tends to promote com-unity of interest. The economic esult of absenteeism has been the ubject of much debate among olitical economists, but there seems be a general consensus of opinion nong them, as there certainly is in e popular mind, that the A. by ending his money abroad is de-iving the industries of his own untry of support. On the other nd, it is argued that the A. still directly supports the industries of e homeland, for there must be an ort of goods from his native country equivalent to the amount goods he consumes, otherwise his mittances could not be made to hi To absenteeism much of Irish pover has been attributed, and acts we passed in the reigns of Richard I and Henry VIII. to check it.

Absinthe (from the Greek ἀψίν θιον, unpotable), the name of a spirit chiefly manuf. and consumed in France, but also distilled in Switzerland (especially in Neuchâtel). It is a sort of cordial, and on the average contains sometimes as much as 80 per cent. of alcohol. The name is derived from *Artemisia absinthium*, the bitter essential oil of wormwood, which is the chief among other essential oils, such as those of angelica-root, star-anise, of which it is compounded. A. is green in colour, which is due to the maceration of the liquor with spinach, parsley, or other herbs. The naturally deleterious effects of A. are heightened by the adulteration of the liquor by indigo. Absinthism, or the physical derangement induced by excessive indulgence in the liquor, was unfortunately common in France. The symptoms include horrible dreams, hallucinations, and other nervous disorders, and if indulgence is persisted in, end in idiocy, or paralysis. Emile Zola in his *L'Assommoir* gave a terrible and realistic account of the evils of A. poisoning. A. was formerly used in the Fr. army, especially during the campaign in Algeria, for its supposed efficacy in cases of fever, but its use has now long been discontinued, and both the manufacture and sale of A. are now forbidden by law in France.

Absolute, its adjectival signification is opposed to relative, contingent or conditioned; the result of the highest abstraction. Thus it has come about that in its substantial sense it has been regarded by some as the fundamental principle and cause of all being, τὸ ὄν, while others (notably Hamilton and Renouvier) regard it as a fantastic conception—a pseudo-idea. These differences of opinion arise from the fact that our minds can only regard anything relatively which is opposed to the principle of the A. That the A. is the all-pervading, unconditioned, and necessary principle of all things is the basis of the philosophy of Descartes, Spinoza, Schelling, and Hegel, while Kant holds that the mind cannot form an idea of the A. Perhaps it is best to regard it as what is constant, invariable, and necessary in the relation between one idea and another—as that which could not be other than what it is whether regarded subjectively or objectively.

In physics A. velocity is rate of

motion through space as opposed to relative velocity, which is the rate with which two objects approach or recede from each other. In grammar A. signifies independent upon any other part of the sentence as nominative A. For A. Alcohol, *see* ALCOHOL. For A. monarchy, *see* ABSOLUTISM.

Absolution, a religious ceremony by which the Christian priest declares an individual, on repentance and submission to the requisite penance, to be absolved either from his sin or from the ecclesiastical punishment to which it rendered him liable. Since the twelfth century the formula used in the Roman Catholic Church has been: Ego te absolvo a peccatis tuis (I absolve thee from thy sins), accompanied with the sign of the cross. The Council of Trent has expressly condemned (Session xiv. Canon 4) the doctrine that the priest has not power of himself to absolve from the guilt of sin. The Church of England also holds, as may be seen in the Order for the Visitation of the Sick, that power has been left with the church to absolve repentant sinners, and the words that the minister uses are the same as those employed in the Catholic communion: 'I absolve thee from thy sins.' In the Protestant Church of Scotland, the term A. is commonly used to denote simply the declaration of the Kirk session, or other judicatory, expressed by the mouth of its president, that the party is released from the ecclesiastical interdict to which his delinquency had subjected him; this approaches the original use of the word with the early Christians.

Absolutism, the form of gov., as opposed to constitutionalism, in which the king or ruler is the supreme head, responsible to no parliament and having no constitutional check. But A., as it existed in the middle ages, does not exist to-day. It was then a necessity in order to centralise the strength of a nation for self-defence, and to remove the power of the feudal lords by turning them from autocrats into courtiers. A typical absolute monarch was Louis XIV. At the present day there are constitutional govs. in most civilised countries. *See* GOVERNMENT.

Absolutists, a Spanish political party opposed to the constitution of 1812. They wished to restore to the crown its lost absolute powers, and were opposed by a party called the Exaltados. Subsequently the A. supported the pretentions of Don Carlos against Queen Isabel.

Absorption, the process by which a substance is sucked up by another. When a liquid is absorbed by a substance as blotting-paper, the action depends on capillarity (*q.v.*). Plants are enabled by their root-fibres to absorb liquid matter into their tissues. In the process of digestion, the intestines absorb compounds necessary for the nutrition of the body. Cutaneous A. means the sucking up by the skin of oily materials; this occurs when ointments are used. The term A. has also some special applications in physics.

A. of gases by liquids.—Gases are absorbed or dissolved by liquids when the gases themselves become reduced to the liquid form. The solubility of different gases in water varies considerably. One volume of water at 0° C. and atmospheric pressure absorbs only ·02 volume of nitrogen, whilst ammonia at the same temperature and pressure dissolves to the extent of 1050 volumes to one volume of water. The amount absorbed increases in proportion to the pressure, but decreases as the temperature increases, though not in exact proportion.

A. of gases by solids.—Some solids also have the property of absorbing gases, the best known example being charcoal, which can absorb so much oxygen and ammonia that it must result in them being in a liquid state. To this power of absorbing gases charcoal owes its efficacy as a disinfecting medium, the gases produced in putrefaction being taken up within its pores. Platinum-black, if surrounded by a mixture of hydrogen and oxygen, absorbs so much of the gases, and therefore brings them into such intimate molecular contact that sufficient heat is given out to ignite the rest of the gas.

A. of light and heat.—Wave motion in the æther, certain kinds of which produce the sensations of light and heat, is liable to be interrupted by intervening substances. Some rays may be transmitted with more or less disturbance of direction, some may be reflected, and some may be absorbed; that is, work is done on the particles of the intervening substance, and its temperature rises. A particular substance may absorb rays of certain frequencies, allowing the others to be transmitted or reflected. The long, slow waves produced by electrical methods can pass through thick, opaque obstacles without being absorbed. The quicker heat waves are absorbed readily by dark substances such as lamp-black, whilst the various wave-lengths which correspond to the different colour sensations are variously affected by different substances, the result determining the colour as seen by transmitted or reflected light. In green glass, for example, only green rays are allowed to pass through,

the other components of the white light which enters the substance being absorbed and converted into heat. What light is reflected is white, so that if green glass be ground up it reduces to a white powder; similarly, the foam of a transparent green liquid is white. Even reflected light penetrates the surface to some extent, and the amount of penetration has an effect on the character of the A., and consequently on the colour of the reflected light. Gold, for instance, reflects white light at the surface, and also light which by A. before it comes to the surface is orange. In the interior of a gold vessel we get repeated reflection, which means repeated A., and the resultant colour is a deep orange.

A. bands are dark lines in the spectrum of light transmitted through gases. They indicate the absence of the particular wave-lengths absorbed by the gas, and may vary with the temperature and thickness of the same gas.

Abstinence, *see* TEMPERANCE, BANDS OF HOPE.

Abstract. In law, the brief statement of the prin. fact in a document —used now generally with relation to the purchase of land—the A. being furnished by the vendor to the purchaser; in time, it extends about 20 years back, and tabulates births, marriages, deaths, etc., which have relation to the land in question. If not satisfactory the purchaser must object within a certain period.

An A. thought or term has regard only for qualities or essences without reference to individual or particular things, *e.g.* wisdom.

Abstraction is an act of the mind by which it directs its attention to particular attributes of an object or objects without regard for the other attributes which the object may possess. Thus in the objects, *coal, pitch, negro,* we see the quality of *blackness,* and this we may *abstract* from the other qualities or attributes in the objects and consider it independently. All names of classes, inasmuch as the individual *members* cannot be identical, are formed by a process of abstraction—thus the word *ship* connotes a certain number of attributes, and all objects possessing these attributes fall under the heading ship. The higher the abstraction the greater number of objects embraced. Thus the term *object* includes a multitude of abstractions. Abstraction, then, is formation into classes and species. The highest abstractions are *time, space,* and *being.* Abstraction involves such generality that A. reasoning is apt to be fallacious if attention is not held continually to concrete objects. *See* GENERALISATION.

Absurdum, Reductio ad, the argument which proves not the thing asserted but the absurdity of everything that contradicts it: used in geometry to demonstrate the converse (*see* CONVERSE) of a proposition already proved. It is perhaps not so satisfactory as the direct proof and certainly nc ... it is obvious tha ... contradicts a ..., the proposition itself must be true.

Absyrtus, or **Apsyrtus,** son of Æëtes, King of Colchis, who with his sister Medea fled with Jason. Medea killed her brother and strewed his dismembered limbs on the road so that the pursuing Æëtes might be delayed gathering them.

Abt, Franz (1819–85), Ger. composer of song-music, who wrote upwards of 200 songs, the most celebrated being 'When the Swallows homeward fly.'

Abu-Bekr, father-in-law of Mohammed, first calif of Islam, *b.* at Mecca *circa* 572, *d.* and buried at Medina, 634. ... his califate ... as he had to ... of the partis ... son-in-law, a ... faith some of the tribes who had relapsed into heathenism. In addition, he had to suppress numerous pretended prophets, notably Mosaylima. This he did with the able assistance of his two lieutenants, Omar, who succeeded him, and Khalid. After a victorious campaign against the Byzantine emperor Heraclius, in which he added Syria and part of Persia to his dominions, he *d.* on the day of the fall of Damascus. It was Abu-Bekr who first collected the oral and written precepts of Mohammed and embodied them in the Moslem sacred book, the Koran.

Abu-Klea, vil. on the route from Korti to Metammeh, where an Eng. army under Sir H. Stewart defeated the forces of the Mahdi.

Abulfaragius, or **Abulfaraj** (1226–86), a celebrated Oriental writer; *b.* at Malatia in Armenia of Jewish parents, he early embraced Christianity. Became bishop of Gubos at the age of 20, and later of Aleppo. In 1266 was elected primate of the Jacobite Christians. A. was a great linguist, and translated himself many of his works. He wrote a commentary on the Syriac version of the Bible, but his chief title to fame rests on his general history of the world from the creation down to his own time. It was called *The History of the Dynasties,* and the parts dealing with the Mogul

Tartars and the conquests of Genghiz Khan are of great value.

Abulfeda (1273–1331), Moslem prince, *b.* at Damascus, and while a youth distinguished himself in the campaigns against the Crusaders and the Tartars. The Mameluke sultan Nasir raised him to the rank of king in 1310 by conferring on him the kingdom of Hamah, which he ruled as an independent ally of Nasir. Of his numerous works the two best known are a universal history and a treatise on geography. The history is of special value, and one of the chief sources of information concerning the Saracens. Part of the work which treats of the history of Islam was translated into Latin by Reiske and edited by Adler (Copenhagen, 1789–94) in 5 vols.

Abu Nuwas (*c.* 760–810), lyric and erotic Arab. poet of partly Persian descent. Educated at Basra, he spent one year in the desert among the Arabs, and later lived under the protection of Calif Haroun al-Raschid in Bagdad. The *Divan des Abu Nuwas*, trans. by A. von Kremer, was pub. in Vienna in 1855; in the original in Cairo in 1860, and in Beyrout in 1884.

Abu Ul-Maarri (973–1057), Arab. poet, letter writer, and lecturer. Attended the lectures of the best contemp. teachers at Aleppo, Antioch, and Tripoli. Developed advanced views on vegetarianism and cremation. Works include poems under the title *Saqt uz-Zand*, later poems, the *Luzumiyyat*, and a collection of letters trans. in the *Journ. of the Roy. Asiatic Soc.* (1900).

Abuse, a legal term. *Abuse of Distress, i.e.* in an irregular manner to make use of goods distrained on, as, for example, working a horse, which is an offence which makes the offender liable to an action for damages. *Abuse of Process, i.e.* the bringing of vexatious actions, is guarded against by certain rules of the Supreme Court, notably Order XXV., Rule 4, and by the Vexatious Actions Act, 1896. By the former rule a court can dismiss an action which appears to be of a frivo-ous nature, and by the latter act, on n application made by the attorney-eneral, any person who habitually nstitutes legal proceedings without easonable cause may be restrained om so doing by an order of the urt. By the common law of Eng-nd any sufferer from a malicious tion either in the criminal or bank-ptcy court has the right to bring action to recover damages.

Abushire, *see* Bushire.

Abu-Simbel, *see* Ipsambul.

Abutilon (Arabian *aubutilun*), or ian mallow, a genus of plants onging to the Malvaceæ, of which eighty species are known. They tropical or semi-tropical, but du the warmest part of the year be grown in the open air in land. *A. Avicennæ*, or velvet-l is grown largely in China for jut-

Abutment, a technical term use architecture to denote that part an arch which receives the late pressure, and in machinery to in cate that point at which resistan is obtained. Thus the breech of gun, the end of a steam cylinder, a the As. to the explosive or expandin force.

Abuttals, the buttings or bound aries of land or of a parish. Th ceremony of 'beating the bounds sometimes performed consists of priest making a tour of his parish and striking each abuttal with a wand.

Abydenus, Greek historian whose history of Chaldæa, or Assyria, has been lost except for some fragments quoted by Eusebius and other of the early fathers of the church. The time at which he lived is uncertain, but certainly not anterior to 250 B.C.

Abydos, anct. tn. on the Asian shore of the Hellespont, or Dardanelles. Facing it on the European side was Sestos. Here it was that in 480 B.C. the Persian monarch Xerxes built his famous bridge of boats to enable his immense army to cross. The bridge was described by Herodotus, and was nearly a mile long. Abydos will always be remembered for its association with the legend of Hero and Leander. Byron in his poem *The Bride of Abydos* recalls this story. *See* Herodotus, ii. 134–39, 261.

Abydos, next to Thebes the most important tn. in the anct. kingdom of Upper Egypt. Here in a small ruined temple was discovered in 1817 the 'Table of Abydos,' so important to Egyptological research. This contained a genealogy of the early kings of Egypt.

Abyla, or **Abila**, one of the Pillars of Hercules on the African shore of the Straits of Gibraltar.

Abyssal (from Greek ἀ, without, βυσσός, end) Fauna is one of the three divs. of marine fauna, the others being littoral or shallow-water, and pelagic or surface fauna. They exist in the greatest depths of the ocean, and when brought to the surface their bodies are always shattered owing to the diminution of pressure. The uniform coldness of temperature, the total absence of light, and the enormous pressure of water naturally cause great modifications among them. Many are blind, while others see by means of the phosphorescent glow emitted from their own bodies and those of other fish. Their organs of touch are frequently highly deve-

loped. As no plants can grow in the abyssal depths because of want of light, the fauna are carnivorous, catching in their wide jaws the falling débris of the organisms which exist above them. In colour they are very vivid; scarlet, violet, orange, and purple being the predominant colours, but not blue. The chief A. F. are echinoderms and sponges, while there is a noticeable scarcity of crabs, molluscs, corals, and annelids.

In their discovery, the researches of H.M.S. *Challenger*, sent out 1872–76 by the British Gov., are invaluable. The Prince of Monaco has also done good work in this connection. See *Reports on the Scientific Results of the Voyage of H.M.S. Challenger*, by Sir Chas. Wyville Thomson and Sir John Murray, 1880–95; *Notes by a Naturalist on the Challenger*, by H. W. Moseley, 1879.

Abyssinia, an inland country situated by the Red Sea between 5° and 15° N. lat. and 35° and 42° E. long. Its boundaries are, on the N. Eritrea, on the S. Anglo-Egyptian Soudan, on the S.E. British E. Africa and the British, Italian, and Fr. possessions in Somaliland. It is separated from the Red Sea by a margin of varying width, composed of European possessions. Its area is 350,000 sq. m. The Abyssinian empire comprises the states of Abyssinia proper, Shoa, Kaffa, and Gallaland, and Central Somaliland. Of the whole area Abyssinian Somaliland occupies one-third. Among the inhab. the country is calle[illegible] Ethiopia. The name Abyssinia is derived from Habesh, meaning 'mixed,' on account of the varied nature of its peoples.

Abyssinia is a vast plateau intersected by deeply running rivers, whose beds have been worn to considerable depth, and in this way island-shaped masses of land have been formed called 'ambas.' A feature of these ambas is their almost perpendicular ascent, a characteristic which marks almost the whole of the plateau. The region owes its formation practically to volcanic origin, but, save for a few hot springs, the volcanic action is now extinct. The highest peaks are found in the Simen and Gojam ranges. As the slope of the country is least steep towards the W., the majority of the rivs. empty themselves in the Nile. Many, however, of lesser signific[illegible]

[illegible] disappears. This remarkable phenomenon is partly explained by the great depth below sea-level of the lake. Compared with smaller and neighbouring lakes the Aussa is almost fresh, while salt is present in the others to such a degree that it deposits a crust round the edges. The R. Abai, which forms the Upper Blue Nile, reaches that riv. through Lake Tzana. The Takazzé joins the Nile, changing its name, on nearing the confluence, to that of Atbara. The Moreb flows into Nubia, but disappears later in the sand. Of all the physical features of Abyssinia the Lake Tzana is the most arresting. It is 60 m. long and presents a most striking picture.

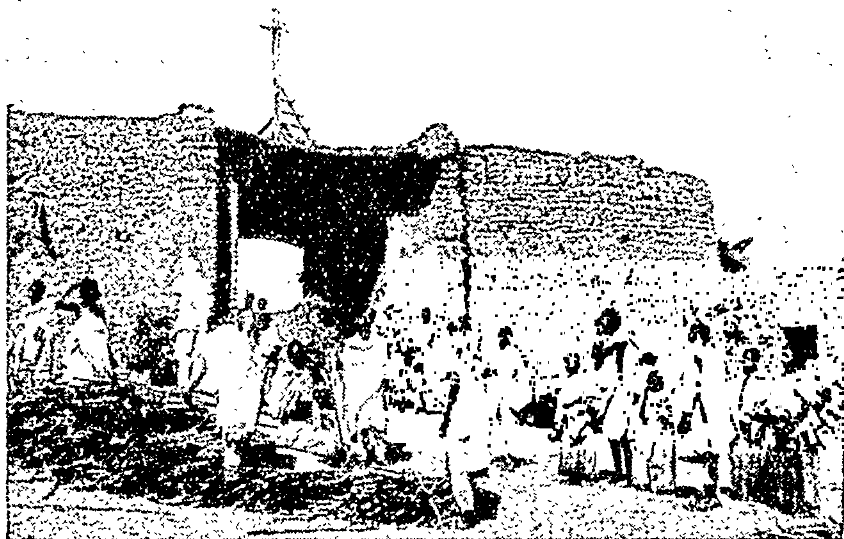
Generally speaking, the climate of Abyssinia is temperate and fairly salubrious, owing to the practically uniform elevation, though in some parts a very wide range of temperature is covered during the day. The weather conditions may be divided into three periods: the cold season, from Oct. to Feb.; the hot, dry season till June, and the rainy season for the rest of the year. Rain is an important factor in Abyssinia, as the Nile depends for its flood entirely upon its Abyssinian tribs. The climate is conducive to the luxuriant growth of the following trees; date-palm, mimosa, giant sycamore, gum (in many varieties), pine, fig, orange, pomegranate, peach, apricot, and banana. Among the smaller plants, cotton, indigo, and the sugar-cane grow in profusion. In the Kaffa country coffee is indigenous, and is believed to take its name from that region. The staple food of the community is to a large extent dependent upon a regular supply of honey, a fact which gives bee cultivation much impetus. Abyssinian crops suffer considerably from swarms of locusts which visit the country periodically.

The political divs. of Abyssinia are composed of provs. and dependent states. The former contain Tigré in the N.E., Amhara in the centre, Gojam, enclosed in a great sweep of the Abai, and Shoa, on the E. of the Abai. The dependent states are many, among which may be numbered the Wallega region, the provs. of Harra, Kaffa, and Gallaland, and Central Somaliland. The only large tn. of Abyssinia is Harrar, of Arab origin. Periods of incessant warfare, and the frequent exhaustion of natural productions, account for the non-existence of large tns. The cap. of Abyssinia is Adis-Ababa, in Shoa; other tns. are Adowa, Adigrat, Macalle, and Antalı, in Tigré; Magdala, Debra-Tabor, Ambra-Mariam, and Sokota (at the confluence of all the great trade routes), in Amhara; Aliu-Amber, Debra-Berhan, in Shoa; Leika in Gallaland, and Bonger in Kaffa. Most of the transport of Abyssinia is carried on by means of

pack animals, so few of the roads are fit for wheel traffic. Many miles of macadam road were constructed in the neighbourhood of the capital a few years ago. There is one railway, however, that of the *Franco-Ethiopian* Railway Co. running from French Somaliland to Addis Ababa, which is 488 m. long. This railway is under French control. Telegraphs and telephones connect the capital with Harrar and other places. The soil is extremely fertile. In fact Egypt owes all the richness of its own soil to the sediment brought down by Abyssinian rivs. Agriculture is followed on a large scale. Coffee is among the most important productive features of the country. Of mineral resources gold and salt are the most plentiful, silver, coal, and iron existing in small quantities. Nearly all the external export trade of Abyssinia is carried on *via* Aden. Commercially, Abyssinia remained for a long time in a backward state, and not until the twentieth century, under the enlightened and wisely directed energy of Menelik II., was any effort made to advance its interests. Foreign undertakings are gradually getting a footing in the country, mainly in the cultivation of coffee and cotton. The annual value of Abyssinian trade is estimated at approximately £2,500,000. A big trade is done with the Sudan, principally in hides, coffee, and shea butter.

The gov. of Abyssinia is feudal in its methods of administration. The princes possess powerful influence, and form a council in an occasional meeting called by the emperor. The inhab. are mainly Abyssinians, and the Galla and Somali tribes. The pop. is estimated at about 10,000,000. The Abyssinians, properly so called, number less than 4 millions, and inhabit Tigré, Gojam, Amhara, and part of Shoa. The Gallas, mixed Christians, Pagans and Moslems, number over 5 millions. In character the Abyssinians as a whole are indolent, easily appeased when offended, vain, and selfish. Morally they are lax, and marriage laws are lightly regarded. Indeed polygamy is a common practice. Their religion consists of a less enlightened Christianity, and since their conversion in the fourth century, they have kept their connection with the Alexandrian Church through a Coptic head bishop. The Danakil profess Mohammedanism.

In early times Abyssinia, or more correctly Ethiopia, was closely connected with Egypt. Legends trace their origin so far back as a descent from the tribe under the queen of Sheba, their ruler. The kingdom was subjected to the sway of the



E. N. A.

HARRAR

This scene outside the main Gate shows piles of sticks, representing customs dues, one or two sticks being taken from every bundle brought into the town.

Hebrews and the Greeks successively. Christianity was introduced about A.D. 330. The actual history begins with the kingdom of Axum. Relations with the civilised world were severed after a Mohammedan conquest of the country in the middle of the seventh century. In A.D. 1000 a general massacre was carried out by Princess Judith of all the royal family. The infant king, however, was safely conveyed to Shoa. Here he was welcomed, while the rest of the country was ruled by Judith. In 1268 the country was regained by the royal house, the reigning monarch being Tekunō Amtak. Portuguese attention was directed to Abyssinia in the fifteenth century. A settlement resulted, and lasted six years, the royal family accepting the Romish Church. In 1634 a rising against Roman dominance resulted in the resignation of the negus (king) in favour of his son. A state of general confusion followed, no emperor being recognised. In 1769 Michel Sohul, the king of Tigré, installed himself as Ras (Prime Minister) over Abyssinia, after assassinating Joas, the reigning monarch. A Galla chief soon overthrew him and assumed the position of sovereign, a dignity which eventually reached his grandson, Ras Ali. In 1850 a native of Ambara named Kassai, afterwards Theodore, defeated the Ras, and, marrying his daughter, proclaimed himself governor. Three years later he conquered all opposition and installed himself as Negus of Abyssinia. He received assistance in governing from two Englishmen, who were killed in a rising in 1860. His rule now developed a tyrannical character, and so severe became his administration that a general rebellion spread all over [illegible] put down w[illegible]ilure to secu[illegible]ed a violent [illegible], and British and foreign envoys and missionaries were imprisoned. Peaceful overtures to obtain their release proved futile, and an expedition under Napier landed in 1868. The ill-success of Theodore compelled him to treat for peace. He refused personally to surrender, and committed suicide within the fort he had failed to defend. No sooner had the British left, than renewed strife broke out among the various chiefs for the crown. Prince Kassai of Tigré was successful in proclaiming himself emperor, though he failed to control insubordination among the various states. Meanwhile the Egyptians had become his enemies. An engagement resulted in such terrific slaughter that the parties mutually retired, and till 1882, when Soudan was abandoned by the Egyptians, the difficulties of demarkation proved very troublesome. The Italians in 1885 occupied Massowah, and afterwards established friendly relations. Four years later Negus John II. died, and Menelik of Shoa became emperor. In a treaty Italy assumed control of Abyssinian affairs, the empire becoming an Italian protectorate. In 1895 a rising under Menelik resulted in Abyssinian independence. Following the ratification of the treaty, European missions were dispatched, [illegible] was concluded with [illegible]. With the exception of [illegible], however, the question of frontier w[illegible]. In 1899 a [illegible]omed Abdullah [illegible]aused co-operati[illegible] and although [illegible] was rendered, [illegible]ot be disregarde[illegible] Abyssinia to accept and request British aid. In 1906 an Anglo-French-[illegible]t their [illegible]ries in [illegible] (*See* [illegible]*ssinia*, 1901; Bruce's *Travels*, 1804; Mountnorris' *Voyages*, 1809–11). King Menelik died in 1913, and was succeeded by Lij Yasu, his grandson, who, coming under German influence in the Great War, was deposed by public proclamation in 1916, and Waizeru Zauditu, a daughter of Menelik, was nominated and subsequently crowned empress. At the same time Ras Taffari, a great-nephew of Menelik, was proclaimed heir to the throne, and for some time acted as regent to his aunt. In polity, the Government remains essentially feudal in character, but in 1919 a tentative step in the direction of Cabinet Government was taken. In 1923 A. became a member of the League of Nations. In 1924 a royal edict was promulgated to provide for the gradual manumission of slaves. The Empress Zauditu died in April 1930, from Lent fasting following paratyphoid. Her death ended the dual form of Government of empress and regent, which had never been a success, especially as King Taffari, supported by the more educated elements in A., had always wanted to develop A. on modern lines. In 1927 he had been proclaimed emperor or king of kings (*Negus Negusti*) and late in 1930 was crowned emperor. *See* ETHIOPIA.

Acacia, a genus of trees and shrubs, usually thorny, belonging to the sub-order Mimoseæ of the order Leguminosæ. It comprises over 400 species, found chiefly in the equatorial zone and the sub-tropical regions of

Australia and Africa. The *A. julibrissin*, however, is grown in the open air in some parts of France and the warmer European countries, and is remarkable for its clusters of beautiful lilac flowers. The leaves of the genus are normally bipinnate, but are subject to modification, and the flowers grow in a head. The Australian 'wattles' are As. in which the leaf-blade is absent, but the leaf-stalk has flattened into a phyllode with the edge presented to the light, and a thick epidermis which prevents transpiration. In America the fruits of the edible A. are used as food; in the islands of Mauritius and Réunion the leaves of *A. Lebbek* serve as soap. *A. arabica* is used in tanning and gives gum-arabic, while gum-senegal comes from *A. Senegal.* The drug catechu is prepared from *A. catechu.*


ACACIA

Acacia, Pseudo-, *see* ROBINIA.

Acacius (340–365), bishop of Cæsarea, surnamed Monophthalmus (Gk., 'one-eyed'), founded an Arian sect known as the Acacians. His doctrine was that Christ is not of the same substance as God, but merely resembles Him.

Acacius (*d.* 489), patriarch of Constantinople from 471. He attempted to make Constantinople the chief of the E. churches, and was excommunicated by Pope Felix III.

Academic Committee (London), *see* ROYAL SOCIETY OF LITERATURE.

Academic Legion, an armed troop of Viennese students who joined in the revolt of '48.

Academus, a mythical Attic hero who was supposed to have revealed to Castor and Pollux the hiding-place of their sister Helen. The academia in which Plato used to teach his pupils is said to have been named after him.

Academy (Gr. Ἀκαδημία), a garden in the Ceramicus, a W. suburb of Athens, so called after the hero *Academus*; *a gymnastic school* was held there; purchased by Cimon, son of Miltiades, who adorned it with statues and olive plantations and left it to the public; a favourite walk of Socrates and his disciples, but now famous because Plato, whose home was in the neighbourhood, taught there; his followers soon came to be called academici, and academic philosophy was synonymous with that of Plato. There was after Plato's death some variation in the philosophy, which caused the following distinctions to be made: Platonic A. under Plato, 398–348 B.C.; the Ancient A. under Speusippus, Xenocrates, and Polemo (*q.v.*); the Middle A. under Arcesilaus (*q.v.*); and the New A. under Carneades (*q.v.*). Two more As. were founded after these: the Fourth A. by Philo of Larissa (*q.v.*), and the Fifth A. by Antiochus of Ascalon, which terminated 79 B.C. Ptolemy Soter (*q.v.*) had endowed a museum essentially an A. at Alexandria, 314 B.C.; Charlemagne, at the suggestion of Alcuin, a school or institute resembling essentially an A. in 796 A.D. at St. Martin's, Tours. Until the time of the Revival of Learning most of the learning was to be found in the monasteries, some of which might be regarded as As. After the Revival of Learning most learned bodies were called As. The following is a list of As. alphabetically arranged according to the towns in which they are. The dates of their establishment are given. *Ancona*, Academia dei Caliginosi, 1642. *Belgrade*, Servian A. *Berlin*, Akademie der Wissenschaften, 1700, founded by Frederic I.; of Architecture, 1799. *Bologna*, Eccles., 1687; Mathematics, 1690; Sciences and Arts, 1712. *Boston, Amer.*, A. of Arts and Sciences, 1780. *Brescia*, A., 1801; dei Erranti, 1626. *Brest and Toulon*, Military, 1682. *Brussels*, Académie Royale, 1773. *Bucharest*, Roumanian A. *Caen*, Belles Lettres, 1705. *Chicago, U.S.A.*, Sciences, 1865. *Christiania*, A., 1837. *Constantinople*, A., 1851. *Copenhagen*, Sciences, 1742; National A. *Cortona*, Antiquities, 1726. *Dublin*, Royal Irish A., 1782; Royal Hibern. A., 1803. *Edinburgh*, Roy. Scot. A., 1826. *Erfurt*, *Saxony*, Sciences, 1754. *Faenza*, the Philoponi, 1612. *Florence*, Fine Arts, founded by Brunetto Latini, 1270; Platonica, founded by Lor. de Medici, 1474 (dissolved 1521); Della Crusca or Furfuratorum, 1582; Del Cimento, 1657; Dei Geogofili, 1752 (agric.); Antiquities, 1807. *Geneva*, Medical, 1715. *Genoa*, Painting, etc., 1751; Sciences, 1783. *Göttingen*, Gesellschaft der Wissenschaften, 1752. *Haarlem*, Sciences, 1760. *Helsingfors*, Societas Scientarum. *Leipzig*, A., 1768. *Leningrad*, Akademiya Nauk Soyuza Sovetskich Socialisticheskich Respublik, formerly known as the Imperial, 1728. *Lisbon*, Port. A., 1779. *London*, Roy. Soc., 1662; Roy. A. of Arts, 1768; Roy. A. of Music, 1823. *Lyons*, Sciences, 1700. *Madrid*, Roy. Span., 1713; Hist., 1730; Painting and the Arts, 1753. *Mannheim*, Sculpture, 1775. *Mantua*, the Vigilanti (Sciences), 1704. *Marseilles*, Belles Lettres, 1726. *Massachusetts*, Arts

and Sciences, 1780. *Milan*, A., 1838; Architecture, 1380; Sciences, 1719. *Modena*, Società Italiana delle Scienze. *Munich*, Arts and Sciences, 1759. *Naples*, Rossana, 1540; Secretorum Naturæ, 1560; Sciences, 1695; Herculaneum, 1755; Nuova Società Reale. *Newhaven, U.S.A.*, Connecticut A. of Arts and Sciences, 1799. *New York*, American Geographical Society, 1852; Lit. and Philosophy, 1814; Sciences, 1876 (founded as Lyceum of Nat. Hist., 1818); National A., 1863; Lyceum of Nat. Hist., 1824. *Nîmes*, Royal A., 1682. *Padua*, Poetry, 1610; Sciences, 1792; A., 1779. *Palermo*, Medical, 1645; Fine Arts, 1300. *Paris*, Académie Royale de Peinture et Sculpture, 1648; Académie Roy. d'Architecture, 1671; Académie Française, 1635; Académie des Inscrip., 1663; Académie Roy. des Sciences, by Colbert, 1666; Académie de Peinture, by Le Brun, 1648. All suppressed in 1793; 1795 Institut National was founded. This was divided into three then four parts in 1803, and in 1816 the original names were restored to these four parts by Louis XVIII.: (*a*) L'Académie Française; (*b*) L'Académie des Inscriptions et Belles Lettres; (*c*) L'Académie des Sciences; (*d*) L'Académie des Beaux Arts; and in 1832 L'Académie des Sciences Morales et Politiques. *Parma*, Innominati, 1550. *Pennsylvania*, A. of Fine Arts, 1805. *Perugia*, Insensati, 1561; Filirgiti, 1574. *Pesth*, Hungar. Soc. *Philadelphia, U.S.A.*, Nat. Sciences, 1812; Philosophical Society for Promotion of Useful Knowledge, 1743. *Rome*, dei Lincei, 1609; Umoristi, 1611; Fantastici, 1625; Infecondi, 1653; Painting, 1656; Degli Arcadi, 1656; English, 1752; De' Nuovi Lincei, 1847. *St. Louis, Missouri*, Acad. of Sc., 1857. *Salem, Mass.*, Peabody A. of Sc. *Stockholm*, Sciences, 1741; Belles Lettres, 1753; Agriculture, 1781. *Toulon*, Military, 1682. *Trondhjem*, A., 1760. *Turin*, A. of Sciences, 1757; Royal Institute, 1783; Fine Arts, 1778. *Upsala*, Royal Society, 1720. *Venice*, A., 1831; Medical, 1701. *Verona*, Music, 1543; Sciences, 1780. *Vienna*, Sculpture and Arts, 1705; Surgery, 1783; Oriental, 1810; Kaiserliche A., 1487. *Warsaw*, Language and History, 1753. *Washington, D.C.*, Nat. Geographical Society, 1888; International Academy of Sciences, Arts and Letters, 1910; Smithsonian Institution, 1846.

The word A. is also used to signify: A school or college. A drawing, usually in black and white chalk, from the living model.

Academy, British (London), for the furtherance of history, philosophy, philology archæology, etc., Burlington House. Founded 1902.

Academy (Royal) of Arts (London). When George III. came to the throne of Great Britain in 1760 he commenced to encourage the cultivation of the arts. Attempts had previously been made by the prin. artists to form a permanent A. for the cultivation of painting, sculpture, and architecture, but they had failed. In 1760, however—with the assistance of 'The Society for the encouragement of Arts, Manufactures, and Commerce, in Great Britain,' which was estab. in 1754—the artists opened the first public exhibition which attracted public attention. In 1765 a charter was obtained from the king, and the society became 'The Incorporated Society of Artists.' This, however, was not entirely successful, and a memorial signed by twenty-two artists was presented to the king asking for his sanction and encouragement for a gratuitous national school of art. The king approved, and 'The Royal Academy of Arts in London, for the purpose of Cultivating and Improving the Arts of Painting, Sculpture and Architecture,' was founded, Dec. 10, 1768. Sir Joshua Reynolds was appointed president; G. M. Moser, keeper; F. M. Newton, secretary; E. Penny, professor of painting; T. Sandby, professor of architecture; J. Wall, professor of perspective; Dr. William Hunter, professor of anatomy; W. Chambers, treasurer; and Wilson, librarian. Its first quarters were in Somerset House, but when old Somerset House was purchased by the nation a part of the new building was given to the society. It took possession of its new quarters in 1780, and the first exhibition was held in 1781. In 1836 it was removed to Trafalgar Square, and it was afterwards removed to Burlington House, Piccadilly, its present quarters. It consists of forty academicians, painters, sculptors, and architects; thirty associates; and sev. honorary members. An exhibition of works by living artists is held every summer from the first Monday in May to the first Monday in August, and an exhibition of works by old masters every winter from the first Monday in January for ten weeks. There are schools which give instruction in art, and all [illegible] passed the [illegible] admissible as [illegible] *See* Grave's [illegible] *Dictionary*, 1769–19[illegible]; Hodgson and Eaton's *Royal Academy and Members*, 1768–1830 (1905); Laidlay's *Royal Academy* (1898); *Academy Notes*, Blackburn, 1878–1900. The corresponding American Academy is the National

Academy of Design, founded 1826; it admits 125 painters, 25 sculptors, and 25 architects and engravers.

Academy of Arts and Letters (America) is a select body of men distinguished in the realms of literature, painting and music. It had its origin in the National Institute of Arts and Letters, and its object was the furtherance of all three of these arts. The first seven members of the Academy elected in 1904 were William Dean Howells, Augustus Saint Gaudens, Edmund Clarence Stedman, John Le Farge, Samuel Langhorne Clemens (Mark Twain), John Hay and Edward A. MacDowell. The head offices are in 633 West 155th Street, New York.

Academy, The. The credit of having founded this journal is due to C. E. C. B. Appleton, who otherwise remained inconspicuous in the world of letters. He had received his education at Oxford and the Ger universities, and, having completed his studies, he saw an opening for a new journal of a high standard in England. The first number of *The Academy* appeared on Oct. 9, 1869, and had as its sub-title the words *A monthly record of Literature, Learning, Science, and Art;* the publisher was John Murray, and its price was 6*d*. The aim of the founder was expressed in the quotation he chose from Horace, *Inter sylvas Academi quœ rere verum* (To seek for truth in the groves of Academus). Appleton acted not only as editor of his journal, but also as its business manager, and for ten years he maintained it at a high level of excellence. Among the many famous men who contributed to its early pages were Matthew Arnold, Sidney Colvin, T. H. Huxley, John Lubbock (Lord Avebury), Mark Pattison, W. M. and D. G. Rossetti, R. C. Jebb, F. T. Palgrave, J. A. Symonds, Wm. Morris, Michael Foster, W. W. Skeat, and Max Müller; the reviews were signed with the names of the contributors.

During the years which followed the death of Appleton in 1879 the paper pursued the usual varied career of a periodical. It incorporated *Literature* in 1900; from its position as a monthly it changed to that of a fortnightly and finally a weekly periodical; the price dropped from 6*d*. to 3*d*. It also passed through the hands of various editors, among others being Messrs. C. E. Doble, J. S. Cotton, C. Lewis Hind, W. Teignmouth Shore, and P. Anderson Graham. Lord Alfred Bruce Douglas conducted it from Oct. 10, 1908, until June 4, 1910, when he was succeeded by Cecil Cowper. Five years later, in the autumn of 1915, *The Academy* ceased publication, after a gallant struggle against the difficulties of the paper shortage and the decrease in the numbers of the reading public. In the 46 years of its existence, more than 2260 numbers of *The Academy* had been published.

Acadia or **Acadie**, the name given to Nova Scotia by the Fr. settlers in 1604. *See* NOVA SCOTIA.

Acajutla, chief seaport of San Salvador, Central America, on the Pacific Ocean; pop. 1100.

Acalephæ (from Gk. ἀκαλήφη, a sea-nettle), a name given by Aristotle to the jelly-fish tribe because of their stinging properties. Cuvier covered with the term the Acraspeda, Lucernarida, and Ctenophora, but the nomenclature has since been altered.

Acampichtli (Aztec, 'handful of reeds') (*d*. probably in 1403), the first king of the Aztecs of Mexico. He constructed canals and built stone edifices, and generally improved the conditions of his kingdom.

Acanthaceæ (Gk. ἄκανθα), an order of dicotyledonous, monopetalous plants, allied to the Labiatæ and Scrophulariaceæ. The plants are herbaceous or small shrubs, with a gamopetalous corolla in five divs., a convex receptacle, bifid ovary, leaves without stipules, brilliant flowers nearly always solitary in the axil of a leaf or a bract. Many of the plants have medicinal properties.

Acanthion (from Gk. ἄκανθα, a thorn or prickle), generic appellation applied by Cuvier to some porcupines (Rodentia). The typical species is *A. Javanicum*.

Acanthocephala (Gk. ἄκανθα, a thorn, κεφαλή, a head), a class of parasitic worms of which the *Echinorhynchus* is the chief genus. The largest species, *Gigantorhynchus*, is found in the pig, and may attain a length of more than a yard, but most species are less than 1 cm. in length. It has a cylinarical body with a proboscis furnished with many hooks by which it attaches itself to the intestine of its host. When the embryo is born it is ejected from the body of the host and depends for its further development on being swallowed by an intermediate host, which in the case of *E. gigas* of the pig is the larva of a particular beetle. It continues in these surroundings for a time, but only reaches adult proportions if the intermediate host is eaten by a pig, its permanent host, when the cycle begins again.

Acanthodes (from Gk. ἄκανθα, a thorn, ὀδούς, a tooth), genus of fossil Ganoid fishes estab. by Agassiz. They are found in carboniferous strata near Edinburgh.

Acanthophis (from Gk. ἄκανθα, a thorn, ὄφις, a serpent), a genus of

venomous snakes of small size, which feed on mice and frogs, and have the tail ending in a horny little spike. The typical species is the *A. cerastinus.*

Acanthopterygii (from Gk. ἄκανθα, a thorn, πτερόν, a wing), one of Cuvier's three primary divs. of fish, those in this section having bony skeletons with prickly spinous processes in the dorsal fins.

Acanthurus (from Gk. ἄκανθα, a thorn, οὐρά, a tail), a genus of Acanthopterygii found in tropical seas. *A. chirurgicus,* vulgarly termed Doctors, is a well-known species, having on each side of the tail a sharp movable spine like a lancet.

Acanthus (the brankursine or bear's-breech), the term applied to a plant by the Gks. and Roms., and adopted by Linnæus, which gave the generic name to the Acanthaceæ.

Acanthus, in architecture, is the sculptured leaf which is the distinguishing characteristic of a Corinthian



ROMAN GREEK

capital. The *A. mollis* growing on a tomb suggested this ornamentation to Callimachus in the fifth century B.C.

A capella (It., 'in church style'), a musical term used in reference to compositions in which the vocal parts have either no instrumental accompaniment or else one in which only octaves and unison are employed. In time it is equal to *alla breve.*

A capriccio (It., 'capriciously'), a musical term which indicates that the composition may be played in time and expression according to the will of the instrumentalist.

Acapulco, the most important seaport on the Pacific coast of Mexico, 180 m. from the cap. The harbour is deep and capable of containing 500 ships, but the climate is unhealthy and the tn. subject to frequent earthquakes. That of 1909 practically destroyed the tn. Exports chiefly consist of hides and fruit. Pop. 6000.

Acarides (from Gk. ἀκαρής, small, εἶδος, form), or Acarina, are a low order of the Arachnida, vulgarly known as mites. The body is usually globular and presents no exact div. between the abdomen and cephalothorax. The organs are simple, and the mouth is adapted for biting or sucking. The *Sarcoptes scabiei* produces gall. *Tyroglyphus siro* is the cheese-mite.

Acarina, see ACARIDES.

Acarnan, son of Alcmæon and of Callirrhoë, daughter of the R. Achelоüs. Following tradition, he avenged his father's death by immolating the sons of Phegeus. He became the eponymous hero of the Acarnanians. *See* Apollodorus, iii. 7, 5–7.

Acarnania, a country of anct. Greece, bounded on the N. by the Ambracian Gulf, now the Gulf of Arta, and Ætolia, and on the W. and S.W. by the Ionian Sea. It was inhabited by a piratical race, which formed a league and had for its cap. Stratus, a tn. situated on the R. Achelоüs. It was subdued by the Macedonians in 225 B.C. In 146 it became part of the Rom. prov. of Achæa, and to-day it forms with Ætolia a prov. of modern Greece.

Acastus, king of Iolcus, one of the Argonauts. On his return from Colchis he instituted funeral games in honour of Pelias, his father, whom his sisters had killed, in accordance with the advice of Medea, who had promised to revivify him as a young man. He was dethroned and killed by Peleus. *See* Ovid, *Metam.* vii. 297–349.

Acatalectic (the opposite of catalectic; Gk. καταλήγειν, to leave off), a term in prosody meaning that the metre does not allow of the omission of an unaccented syllable at either end of the line. A sample of catalectic verse is appended:

'There will be danger but danger
 should brace *us,*
If we are bold there is none can out-
 face *us,*
Only the loss of our faith can dis-
 grace *us.*'

The word 'us' at the end of each line may be omitted without materially altering sense or rhythm.

Acatalepsy (Gk. ἀ, without, καταλαμβάνειν, to seize), the name of the doctrine of Arcesilaus, the Gk. philosopher, who maintained, in opposition to the Stoics, that there can be no criterion of truth. The sceptics apply the term to incomprehensibility.

Acatenango, a volcano of Guatemala, Central America, 12,810 ft. high. Near it is a tn. of the same name with a pop. of 3000.

Ac[illegible] of Mexico, in [illegible] R. Acatlan, [illegible] Balsas or Mexcala; pop. about 46,000.

Acatus (dimin. *acatium*), a small

boat, swift and light, propelled by wind or oars, used by the anct. Gks., particularly by pirates. It bore a spike in the front and was curved at the prow.

Accad, *one of the four cities mentioned in Genesis x. as having been* founded by Nimrod with Babel, Erech, and Calneh in the 'land of Shinar.'

Accad or Akkad, an anct. city of Babylonia in the S.E., while Sumir was in the N.W. The sacred texts of Assyria and Babylonia were written in the Accadian language.

Acca Larentia, or Laurentia, a Rom. deity, fabled to be wife of Faustulus, shepherd of Numitor, and foster-mother of Romulus and Remus. According to another legend, she was a courtesan who married a rich Etruscan named Tarrutius, and left her wealth at her death to the Rom. people.

Accalia, often called *Larentalia* or *Larentinalia*, funeral festival celebrated in Rome on Dec. 23 in honour of Acca Larentia (*q.v.*).

Accelerando, a musical term to indicate the quickened movement of a passage.

Acceleration, increase of velocity. According to Newton's first law of motion, a body persists in a state of rest or uniform motion in a straight line unless acted upon by some force. The force therefore tends either to increase the speed of a moving body or to retard it. The former effect is called positive A. and the latter negative A., or retardation. As long as the force acts the A. is produced. A good example is the action of gravity on a falling body. Starting from rest it gives the body a motion of 32 ft. per second at the end of the first second (the average velocity therefore being 16 ft. per second), 64 ft. per second at the end of the next, 96 the next, and so on. *See* MECHANICS.

Accensi, a Rom. name used with sev. meanings. It denoted citizens added to the fifth class of Servius Tullius, also reserve soldiers whose only weapons were sticks and stones (*A. velati*), and inferior officers attendant on magistrates and consuls.

Accent. In modern languages there is a tendency to distinguish one syllable in every word by a more impressive utterance; this is called A. In a long word there are frequently two As., but they need not be equally emphasised: as in the words *mánufáctory* and *immórtalise* and in the phrase 'ón the tóp of the hill' the first A. is comparatively faint. For anct. A., especially the Gk., *see* METRE. The A. of words is variable and has undergone some changes. Thus we say *triumph*, while Milton said *triúmph*, the noun and the verb being distinguished by him as we distinguish nowadays *próduce* the noun and *prodúce* the verb. Comparatively recently *advertisement* has become *advértisement*. The tendency, due to a desire for rapid speaking, is to throw the A. back. The symbols used to denote A. are three: the acute (´), the grave (`), and the circumflex (ˆ). So far we have only spoken of the first: the second denotes the opposite to the acute, or perhaps the absence of it; the circumflex marks a compound of the two first, a rising then a falling of the voice in the articulation of the syllable. These symbols are used in the Fr language with quite a different meaning. The Fr. language, like all other languages, has been found deficient in the number of characters used to mark vowel sounds, and the three symbols above are used for this purpose. Thus the sounds of *e*, *é*, *è*, *ê* in point of A. differ not so much as in point of articulation.

Accent (in mathematics): (1) A mark placed at the right hand of a letter and a little above it to signify different magnitudes of the same kind by means of the same letter with different As., *e.g.* a', a'', x', x''. (2) In trigonometry to express the minutes and seconds of a degree, *e.g.* $8' 10'' = 8$ minutes 10 seconds. (3) To express feet and inches, *e.g.* $2' 6'' = 2$ ft. 6 in.

Accent (in music) is the regular emphasis occurring in a series of notes. It is usually placed on the first note, and a secondary A. falls on the third note of the bar.

Accented Parts of a bar in music are those which naturally require some emphasis, and their position varies according to the time.

Acceptance, Acceptor, *see* BILL OF EXCHANGE.

Acceptilation in Rom. and Scots law meant the remission of a debt by a creditor giving a receipt for money never actually paid. The word was used in theological controversy by the Arminians for the doctrine that the sufferings of Christ were not sufficient atonement for man's sins, albeit graciously accepted by God.

Accession, Deed of. In Scots law, the creditors of a bankrupt or other insolvent person can by a deed approve of, and bind themselves to concur in, the administration of his estate in trust for the general good.

Accession of Property. In the law of England and Scotland, derived from the Romans, property added to either naturally or artificially is said to be acquired by A. *All* accretions to property naturally added belong to the owner of the nuclear property;

thus the offspring of animals, the produce of the soil, the increase of land due to alluvial deposits belong to the owner whose land has been added to or whose fields or cattle have been fruitful. Property acquired artificially, as, for example, when a man builds a house on another's land or embellishes or works on another's material, was generally under the Rom. law held to be the property of the owner of the prin. thing, provided compensation was made for improvement. An exception was made in cases where as the result of labour (which, of course, is a form of property) a totally new thing was produced. Thus the man who made wine from another's grapes or painted a picture on another's canvas retained the picture and the wine and compensated the owners of the canvas and the grapes, thereby reversing the usual rule. In the United States all A. or accretion is, in the absence of any agreement to the contrary, the property of the owner of the prin. materials.

Accessory. In Eng. law an A. is one who, though not the prin. in a felony and even absent at the time of committal, has nevertheless been concerned with the crime, either *before* or *after* the fact. An A. *before* the fact has been defined by a dictum of Lord Hale as one who 'being absent at the time of the crime committed, doth yet procure, counsel, or command another to commit a felony.' An A. *after* the fact is one who, knowing that a felony has been committed, assists, relieves, or protects the felon. The mere knowledge that a felony is about to be committed or the omission to apprehend or report the felon does not constitute accession, and a distinction must be made between As. and prins. in the second degree who are present aiding and abetting. There are no As. in a case of misdemeanour or of treason; all persons concerned are held as prins. and generally receive the same punishment. In Scots law, except for treason, accession after the crime is not recognised, and in the United States the distinction of the Eng. common law between prin. and accessor has by statute been abolished, every person concerned being liable to punishment as a principal.

Acciaccatura (from It. *acciaccare*, to crush), in music, a short *appoggiatura* or grace-note played almost at the same time as the prin. and accented note.

Acciajuoli Donato (1428–78), Italian scholar, *b.* in Florence, who wrote lives of Hannibal, Scipio, and Charlemagne, and commentaries on Aristotle's *Ethics* and *Politics*.

Accidence, a corruption of accidents, signifying the properties and qualities of the parts of speech, as gender, number, and case; originally a small book containing these, but now used to express that part of grammar which deals with inflections (*q.v.*).

Accident, in logic, a property or quality of a thing which is not essential or inherent to it, as whiteness in paper. The word is applied to all qualities in distinction from substances (*q.v.*).

Accident, *see* WORKMEN'S COMPENSATION.

Accidental Colour is the name given to an imaginary colour seen when the attention is fixed on a white surface after it has been concentrated on a bright colour. The complementary colour to yellow is blue, and red to green.

Accidentals, in music, are signs occurring before a particular note, not in the signature, which change the key during the course of a bar. These signs are the flat, double-flat, sharp, double-sharp, and the natural.

Accipenser, a genus of fishes. *See* STURGEON.

Accipitres (Lat. *accipiter*, hawk), Raptores, or Rapaces, the common name for all birds of prey. They appear by day and by night, and are recognisable by their crooked and powerful beaks and talons.

Accius or **Attius,** a Rom. tragic poet, was *b.* 170 B.C., and lived to a great age. Some of his works were on Rom. subjects (Prætextatæ), but the majority were imitations from the Gk. Only fragments of his works survive.

Acclimatisation is the adaptation of plants, animals, and mankind to the difference in climate experienced in some place other than the native country. It differs from *domestication*, which implies protection, and from *naturalisation*, which implies mere residence in another country, by the fact that it requires adaptation. It is made difficult of study in that many other factors are present which would bring about or prevent any change in the original nature of the plant or animal under observation, *e.g.* changed conditions in food, increase of enemies, and in man intermixture of races. One of the common products of A. in all kinds of organic life seems to be fertility, which can be seen in many cases; in others, however, the reproductive element is limited, as in some plants which lose all power of sexual reproduction when transferred to varying climates, and propagate only vegetatively. The fertility of adapted animals has somet[illegible] proved a great [illegible] adopted country, [illegible] rabbits into Aus-

tralia and their subsequent degeneration into a pest being a case in point.

It has been maintained by some scientists that man is incapable of adaptation, but there are many evidences to the contrary. The universality of the Jewish race is well known, and though they originally dwelt in a warm country, they now swarm over Europe in its temperate and cold climates, their numbers in Russia being enormous. As they largely marry among themselves and keep the purity of their race, it is evident that A. has been successfully accomplished in this instance. Again, the Dutch colonists who have settled in various parts of the globe where the climate is tropical, and who have not mixed with other races, are a strong and healthy people. The contention that Europeans who have emigrated to India and S. America deteriorate in health and have delicate offspring does not disprove the A. theory; the delicacy is due to the self-indulgence and indolence of the European races, who will not observe the abstemious habits necessary to the changed conditions of life. It is almost essential that the change of climate should be gradual, for where it is violent the human body has not grown accustomed to its new sphere, and diseases which are comparatively harmless to natives of a country frequently prove fatal to strangers, *e.g.* malaria and liver complaints affect Europeans in the tropics, while lung roubles are common in Africans ransferred to colder climates. Those aces which inhabit the temperate egions, such as the Eng., Fr., and er., are best able to adapt themlves to new climatic conditions. In France a society was founded 1854 by Isidore Geoffrey Saintlaire for the practical and theoreti- study of this subject, and the iété Nationale d'Acclimatation has pted species, and receives assiste from the Jardin Zoologique cclimatation. London has the logical Gardens and Kew Gardens, hich A. can be seen in animals plants respectively. See I. G. t-Hilaire's *Acclimatation et docation des animaux utiles*, 1861; Darwin's *Animals and Plants Domestication*, 1868; J. Hann's *buch der Klimatologie*, 1897.

o, or Accho, in anct. geography of Phœnicia, later called Ptolenow Saint Jean d'Acre (*q.v.*).

olade (from Fr. *accoler*, to em- Old Eng. *accol*, from Lat. *ad*, l *collum*, neck): 1. An anct. ny used in conferring knight- It was supposed that it conof an embrace, but is now believed to have been a slight bl on the cheek or shoulder. 2. music, a brace used to join sev. par

Accolti, Benedetto or **Benedi** (1415–66), an Italian jurist and write *b.* at Arezzo. He became chancello of the Republic at Florence in 145 and held this office until his death His poem of Godfrey of Bouillon' conquest of Palestine, the *De Bello a Christianis contra Barbaros gesto pro Christi Sepulchro*, 1532, was the basis of Tasso's *Gerusalemme Liberata*.

Accolti, Benedetto (1497–1549), Italian cardinal, grandson of above, was *b.* at Florence. He became Cardinal of Ravenna in 1527, and wrote several fine Latin poems.

Accolti, Bernardo (*c.* 1465–*c.* 1535), Italian poet, son of the jurist Benedetto Accolti, was *b.* at Arezzo and surnamed *Unico Aretino*. He flourished in the court of Leo X., and when he announced that he would recite his poems, tradesmen closed their shops and flocked to hear them; unfortunately they have hardly survived him.

Accolti, Francesco (1418–83), Italian jurist and brother of Benedetto Accolti the elder, was *b.* at Arezzo and *d.* at Sienna. He was the foremost jurist of his day, and also a notable man of letters.

Accolti, Pietro (1455–1549), Italian cardinal, brother of Bernardo Accolti, was *b.* and *d.* at Florence. As cardinal of Ancona he had a large share in drawing up the bull against Luther in 1520.

Accommodation, a term used for a method in Scripture by which the truth is modified in order to bring the divine revelation within the reach of human understanding. In the N.T. this is done by means of parables, and in the O.T. the application is frequent.

Accompaniment, in music, is the assistance given to a solo part by subordinate parts either vocal or instrumental. Thus a song or a violin solo may have a pianoforte A. in order to bring out and emphasise the beauty of the primary music. A. is also the harmony of a figured bass.

Accomplice, a person associated with another in committing or attempting to commit a crime. An A. may give evidence in court, *i.e.* turn king's evidence, but, although there is no exact rule to this effect, the general practice is to discount its value unless supported by independent testimony.

Accoramboni, Vittoria (*d.* 1585), duchess of Bracciano, a woman celebrated for her beauty and tragic history. Married to Francesco Peretti, nephew of Pope Sixtus V., she instigated his murder, then married his murderer, the duke of Bracciano.

On his death she was involved in a lawsuit regarding the inheritance with Luigi Orsini, and murdered by him at Padua. Her story has been written in novel form by Tieck in 1840, and she figures as the heroine of Webster's *White Devil*, 1612.

Accord and Satisfaction may be pleaded by a defendant in a civil action in an Eng. court, viz. that he has agreed with the plaintiff, and has acted upon this agreement, to pay money or perform some action in satisfaction of the plaintiff's demand.

Accordion, a musical instrument invented by Damian of Vienna, 1829. It is in the form of a small oblong box, consisting of a row of very small elastic metallic springs, fixed at one end in a plate of metal, so that they may vibrate freely, and a bellows to put the springs into vibration. The instruments vary in size and in capabilities, and two or more notes can be played at once.

Accorso, Francesco (Latinised *Accursius*) (*c.* 1180–*c.* 1260), Italian jurist, *b.* at Florence. He wrote glosses on Rom. law, and his chief work, the *Great Gloss*, was long a standard authority.

Accorso, Francesco (1225–93), Italian jurist, son of above, was *b.* and *d.* at Bologna. He became an Oxford lecturer on law *c.* 1275. Dante mentions him in the *Inferno*.

Accorso, Mariangelo (*c.* 1490–*c.* 1550), Italian writer and critic, *b.* at Aquila. He pub. in 1524 the *Diatribæ in Ausonium Jules Solin Polyhistora, et in Ovidii Metamorphoses*.

Accosted, *see* HERALDRY.

Accoucheur, *see* OBSTETRICS.

Account, general term for a statement of pecuniary transactions between two parties. According to Eng. law, an *A. stated* is one in which both debtor and creditor have agreed to the balance. The debtor is, however, not precluded from showing, if he can, the existence of error, but if the A. has been actually settled by payment it can only be re-opened upon proof of fraud. A *settled A.* is a written statement, agreed to by both parties as correct, of the final position of two As.

All modern commerce is conducted by keeping records of As. (*see* BOOKKEEPING), and public bodies and companies, such as town councils, limited liability companies, friendly societies, also executors and trustees, or administrators of estates and similar officers of the court, are all bound by statute to keep As., and provision is made for audit and inspection. It is also a criminal offence under the bankruptcy laws for the bankrupt to have failed to keep such books as the usage or importance of his business would seem to warrant.

Account, or Accompt, Writ of, a form of legal action now rarely resorted to, but which was much used in early times, for the recovery of money wrongfully retained.

Account, Account Current, Account Sales, *see* BOOKKEEPING.

Accountant, a person skilled in the practice of keeping books of accounts and gene[illegible] bankrupt [illegible] name is [illegible] employed by banks, insurance companies, railways, and other large businesses, whose duty it is to supervise the keeping of accounts and to prepare balance sheets, etc. An *A. of Court* is an officer of the Scottish Court of Session, whose duties are defined by the Judicial Factors (Scotland) Act, 1889, part of which include bankruptcy affairs. The profession of accountancy is generally more of a consultative nature, and an A. one who is called in from outside to audit and investigate books, to give advice as to how they should be kept, and to make reports as to solvency. Their status has been regularised and their standard of efficiency maintained by societies of As., some incorporated under royal charter, and a member of one of these societies is called a *Chartered A.* 'The Institute of Chartered As. of England and Wales' was founded in 1880. In the U.S. is an Association of Public Accountants.

Accountant-General, title of two officials in the Chancery Court and Exchequer Court whose offices were abolished in 1872, and whose duties were transferred to the paymaster-general. The former was appointed in 1726 to manage the moneys of the suitors in the court, and more particularly in connection with the depositing of them in the Bank of England.

Accous, a tn. of France near Oloron in the Basses-Pyrénées, containing medicinal springs; pop. 1000.

Accra, a seaport in, and capital of, the British West African colony of the Gold Coast. It has several churches, a bank, club-house, European shops, many schools and hospitals, 5 m. N. is Achimota College, the chief educational establishment on the Gold Coast. The exports are gold, ivory, palm oil, timber and india rubber. It is the terminus of a railway to Kumasi. Pop. about 40,000.

Accrington, a manufacturing tn. and municipal bor. in Lancashire, about 22 or 23 m. N. of Manchester. It is noted for its cotton manufs., calico-printing, machinery, and weaving, and possesses a town-hall and

market-hall. Coal and iron are worked in the neighbourhood; pop. 43,595.

Accubitum (Lat. *accubitorium*), a couch employed by guests at a Rom. banquet to take the place of the *triclinum* during the empire. It seems to have been adapted for several occupants.

Accum, Friedrich (1769–1838), Ger. chemist, *b.* at Bückeburg in Westphalia, crossed to England in 1793, and became professor of chemistry in London in 1802. He introduced illumination by gas into England by his *Practical Treatise of Gaslight*, 1815. He was appointed professor in Berlin in 1822, and *d.* in that city. His other chief works are: *An Essay on Chemical Reagents*, 1816, and *A Treatise on the Adulteration of Food*, 1820.

Accumulation, *see* CAPITAL.

Accumulation, a legal term implying the A. of income from an estate that has been bequeathed by will or deed, during which time the legatee might not enjoy the estate. Thellusson's Act, 1800 (40 Geo. III. c. 98), which imposed certain restrictions on A., provided that it could only continue during the life of the settler plus twenty-one years, or during the period of legal minority of the legatee. Where A. has been directed contrary to the provisions of this Act, the direction as to A. is null and void but not the settlement, and the property passes to such person or persons as would have been entitled to it had A. not been directed. Certain exceptions, such as the provision for payment of debts and for raising portions for children, etc., are made in Section 2 of the Act. The Act at first only applied to England, but it was extended to Scotland in 1848 (12 Vict. c. 36).

Accumulation of Power, *see* HYDRAULIC ACCUMULATOR.

Accumulator, a term applied to any device for storing energy so that machinery may be worked when the actual engine supplying the motive power is at a standstill. The most common applications of the term are in hydraulics and electricity.

Hydraulic A.—Lord Armstrong's A. consists of a large cylinder in which a piston works through hemp or leather packing. The piston is driven up by the pressure of water forced in at the bottom of the cylinder by successive strokes from a small engine. When the top of the cylinder is reached a catch operates which automatically stops the engine. The piston is usually weighted so as to provide a pressure of about 700 lbs. to the sq. in. The energy accumulated may be used to work cranes, dock-gates, or any machinery where intermittent power only is required. There are varieties of the machine where pistons of different diameters are employed to give differences to pressure, and others where steam pressure is accumulated.

Electric As.—The term is applied to contrivances which are more appropriately known as secondary or reversible batteries. The principle upon which they are constructed is derived from the working of a voltameter, an instrument in which water is decomposed by the electric current. It consists of a glass vessel fitted with two platinum plates connected with wires passing through the glass. When the platinum plates are covered with acidulated water and the wires connected up with a battery, an electric circuit is estab. of which the water forms a part. This causes the phenomenon known as *electrolysis* (*q.v.*), the effect of which is that minute bubbles of oxygen collect at the positive plate or electrode and hydrogen at the negative electrode. These gases are collected in receptacles adjusted to receive them. If, whilst the bubbles still adhere to the plates, the outer current is cut off and the two electrodes connected through a galvanometer, it is found that a reverse current is indicated, the gases recombining through the liquid. It is evident that if the products of electrolysis could be kept in contact with their respective plates, it would be possible to recover during their recombination a large proportion of the electrical energy which caused the decomposition. For such a purpose the electrolysis of water is obviously unsuitable, as the hydrogen and oxygen quickly escape.

Planté's Cell.—Gaston Planté (1834–89) devised a cell in which the products of electrolysis remained in connection with the plates. He used lead instead of platinum, so that the oxygen might combine with the positive electrode to form lead peroxide (PbO_2). Two lead plates, about one-twentieth of an inch thick, are placed upon each other, but insulated by means of india-rubber strips. They are then rolled into a cylindrical form and placed in a vessel containing water diluted with sulphuric acid. A cell is thus provided having lead electrodes of considerable surface. Before the cell is ready for use as an A. it has to undergo a somewhat lengthy preparatory process known as 'forming.' On a current being passed through, the water is decomposed, the oxygen separating out at the positive plate and the hydrogen at the negative. The positive plate becomes oxidised and is covered with a thin coating of lead peroxide.

When the current is cut off, and the plates connected, a secondary current is set up in the reverse direction and the peroxide is reduced to lead, whilst the other plate becomes oxidised. This process of charging and discharging is repeated many times until one plate has a spongy deposit of lead peroxide and the other is covered with lead, also in a spongy condition, owing to its having been reduced from lead peroxide. It is necessary that both substances should be in this porous state in order that the acid may reach as large a surface as possible. It is obvious that the successive chargings and dischargings will take longer and longer as more of the lead becomes oxidised. Planté recommended an ever-increasing period of repose between the steps of the process, so that some months elapse before the cell is ready for use.

An improvement in the preparation of the secondary cell was instituted by Camille Faure, who coated both plates before rolling them up with a paste made of red oxide of lead, which contains a smaller proportion of oxygen. The current has only now to complete the formation of peroxide on the one plate and to reduce the oxide on the other. Thus a good amount of the active material is produced with a great saving of time.

Modern types.—Storage batteries composed of Planté or Faure cells have many disadvantages: they are cumbrous and heavy, the spongy material has a tendency to drop off the conducting backing, and they buckle easily and so cause internal short-circuiting. Many improvements have been devised to obviate these difficulties. The positive and negative plates are now made flat, and are arranged alternately in the box facing one another. The positive plates are all joined together to form one large positive electrode, and all the negatives are joined in the same way. Usually the outside plates are both negatives and can be distinguished by their grey colour, whilst the positive plates are brown. Each plate consists of a framework of sol d lead, with grooves or perforations in which the spongy active material is held. There is a space between the floor of the cell and the plates, so that any active material which becomes loosened drops clear and so does not produce short-circuiting. In some types of A. ebonite separators are used between the positive and negative plates to prevent any contact. Such separators are perforated to allow of the free circulation of acid between plate and plate. The majority of modern secondary batteries utilise the same chemical reaction as in Planté's cell, but in the Edison A. nickel plates are used in a solution of caustic potash. The advantage gained is the saving in weight.

A normal A. working under ideal conditions has an efficiency of 90–98 per cent., *i.e.* 90–98 per cent. of the energy used in charging the A. is recovered in the form of a secondary current. In ordinary use the efficiency of an A. varies from 60–90 per cent., depending on the usage of the cell, and the length of its service. The smallness of the space between the plates has the effect of reducing the internal resistance. They therefore compare favourably with other forms of storing energy. When bent steel springs are used to store energy, it is found that one kilogramme of steel is capable of storing about 4000 megergs (units of energy). One kilogramme of air compressed to one-sixth contains 2,250,000 megergs, of which about 450,000 can be recovered in the form of work. Secondary batteries are capable of storing about 500,000 megergs per kilogramme, of which about 450,000 units can be recovered.

As. can be used for any purpose for which primary batteries are usually employed. The disadvantage of the latter is the comparatively high cost for materials when much power is required, whereas As. are charged by the more economical dynamo, and their maintenance, under favourable conditions, is not an expensive matter. Where direct current cannot be utilised, therefore, As. may be used with advantage.

There are a few applications of As. where their use has contributed greatly to the economy and efficiency of electrical service dependent upon dynamos. A dynamo driven by a gas engine is affected by the alternately quick and slow stroke, with the result that the light flickers. An A. connected with such a dynamo has an equalising effect, because it takes up current during the quick stroke and gives it up during the slow stroke. In systems where electrical power is distributed from a central station, the demand for current varies naturally from time to time. The As. then serve to equalise the load; they absorb power when demand is small, and assist the dynamo during the busy hours. When the load is lightest they may be used to supply the whole demand made upon the station. The cells used for this purpose contain numerous plates and are massive in construction to meet the heavy discharges which may be called for; this naturally entails comparatively great size and weight, and consequently

considerable expense in erection and maintenance. They are liable to rapid deterioration in process of time, especially if they are not intelligently looked after and periodically tested. The traction type of A. has been greatly improved, and is used extensively for the transporting of light loads on small trucks. The cases of the As. in this instance are made of a fibre compound and sealed with bitumen; the plates are also packed very tightly, and they are supported at the bottom by ridged ebonite strips placed edgewise. The electrical equipment now consists of six or seven lamps, self-starter, wind-screen-wiper and many other gadgets, all of which depend on the A. for their supply of current; thus the A. has to be one which will stand rough usage in the running of the car coupled with occasional heavy discharge and little attention. Most of these difficulties have been overcome, and the car A. runs for many months without other attention than that of keeping the level of the electrolyte right in the cell. The modern A. has developed with the increased use of electricity, both for power-house and wireless work. In the power-house the A. is an essential, and modern design tends to develop an A. which can stand very heavy discharge for relatively long periods; the battery helps the plant in periods of heavy load and increases the efficiency of the station. Wireless calls for a very different type of A.: a small, cheap and reliable A. is required. Many modern wireless As. are sent out from the works in a state of dry charge, so that when the A. is filled with acid for the first time it is already charged and ready for use. There is also on the market type of A. in which the electrolyte in the form of a jelly.

Accusative Case, see DECLENSION.

Aceldama (R.V. Akeldama), the ...amaic for 'field of blood,' was the ...me used for the field bought by ...das (Acts i. 18), or by the chief ...ests, 'to bury strangers in' (Matt. ...vii. 6). It is also called 'the ...ter's field' (Matt. xxvii. 7, 10). ...tradition this field is situated S. of ...lower part of the Vale of Hinnom.

...cephala (Gk. ἀ, without, κεφαλή, ...), a term applied by Cuvier to a ... of bivalve molluscs, compre...ng both brachiopods and la...branchs.

...phali (Gk. ἀκέφαλος, headless), ...e given to sev. religious bodies ...rebelled against their bishops ...ther heads of the church. It ...rticularly applied to the Egyp... Monophysites, who declared ...lves free from the authority of Peter Mongus, bishop of Alexan... in 482.

Acephalia (Gk. ἀκέφαλος, head... a term applied to the state of a fo... monster without a head; it usu... lacks also the upper limbs, and i... common condition of such monste...

Acephalus, a hexameter line beg...ning with a short syllable.

Acer, a name applied by the Rom... to our *A. campestris* or commo... maple, the type of Aceraceæ (*q.v.*... It has racemose flowers, sometime... contracted to umbels or corymbs, an... has frequently three carpels. *A... pseudoplatanus* is the sycamore, an... *A. saccharinum* is the sugar maple.

Aceraceæ, or **Acerinæ**, a small order of plants which has for its distinguishing characteristics regular, polygamous or diœcious flowers; five to twelve stamens; two ovules in each carpel. The fruit is double, and has two winged samaras; the seed is exalbuminous. Plants of this order are arborescent or shrubby, nearly all contain saccharine substance, and are found in the N. of Asia, Europe and America.

Aceratherium (from Gk. ἀ, without, κέρας, a horn, θηρίον, animal), Kaup's name for some mammiferous fossils which differ from the rhinoceros in being hornless and in having sharp incisors.

Acerbi, Giuseppe (1773–1846), Italian traveller and naturalist, *b.* near Mantua. He journeyed through Lapland to Cape North in 1799, and pub. an account of his travels in Eng. in 1802 under the title *Travels through Sweden, Finland, and Lapland.* He founded a journal, the *Bibliotheca Italiana*, at Milan in 1816. Later, as consul-general of Austria to Egypt, he collected many antique objects which he gave to Italian and Austrian museums.

Acerenza, the anct. Acherontia, an Italian city on the R. Bradano in the prov. of Potenza. It contains a cathedral built in the Norman style. Pop. 4780.

Acerineæ, see ACERACEÆ.

Acerra (Acerræ), an anct. tn. near Naples, in Campania, Italy, has a cathedral which was rebuilt after the earthquake, 1788, and sulphur springs. It was an old Rom. tn., was burnt by Hannibal, rebuilt and besieged by the Italians during the Social war. Pop. 16,700.

Acersecomus (Gk. ἀκερσεκόμης, with unshorn hair), a title sometimes applied to Bacchus and Apollo on account of their flowing locks.

Acesas, or **Aceseus**, a famous Gk. weaver and artist, *b.* in Cyprus about the fifth century B.C.

Acestes, a mythical king of Sicily, son of a Trojan woman, Egesta or

Segesta, who was sent by her father to Sicily, that she might not be devoured by the monsters which infested the ter. of Troy. The river-god Crimisus begot by her a son Acestes, who was afterwards regarded as the hero who had founded the tn. of Segesta, and who hospitably received Æneas on his arrival in Sicily.

Acestor (Gk. ἀκέστωρ, saviour), a title sometimes applied to Apollo when considered as the god of medicine.

Acetabulum (Lat. *chalice*), a cup-shaped socket of the innominate bone into which the head of the femur fits.

[illegible] LDEHYDE.

[illegible] NH_2), a solid, [illegible] produced by [illegible] ammonium acetate in a stream of dry ammonia. As usually prepared, it has a strong odour suggestive of mice, but this is due to impurities. It is soluble in water and alcohol, melts at 82° and boils at 222° C.

Acetic Acid (CH_3CO_2H) the earliest known acid, formed when wines and beer turn sour through exposure to the air. The change is brought about by the agency of bacteria (*Mycoderma aceti*). The bacteria find their way into the liquid from the atmosphere, are nourished by the food contained in the wine, rapidly multiply, and by means of an enzyme they contain cause the oxygen of the atmosphere to react with the alcohol, forming A. A. The sour liquid, or impure acid, is known as vinegar, and is usually prepared from wine that is otherwise unmarketable.

In the Ger. process, the wine is allowed to percolate slowly through beech shavings smeared with a culture of *Mycoderma aceti*, meeting a current of air on its downward path. This is known as the 'quick vinegar' process, and requires only three days or so to go to completion.

Commercial A. A. is obtained by the dry distillation of wood in iron retorts at as low a temp. as possible. The products of the distillation are gases, an aqueous liquid, and tar. The liquid contains A. A. mixed with methyl alcohol, acetone, and other impurities. It is treated with quicklime, which causes the A. A. to be converted into calcium acetate. This solution is then evaporated, the tarry products being skimmed off. The acetate is then distilled with concentrated hydrochloric acid and the A. A. is separated. It is mixed with potassium permanganate to oxidise impurities and distilled once more, after which the product is sufficiently pure for commercial purposes. A. A. is also manufactured by passing a mixture of oxygen and acetaldehyde vapour over heated manganese di- [illegible] quartz. [illegible] A. A. is a colour- [illegible] with a pungent [illegible] tion on the skin, [illegible] 50 per cent. solution of the acid has the same sp. gr. as the anhydrous acid, and addition of water to a certain point causes the sp. gr. to rise, although it is heavier than water. This circumstance renders it impossible to determine the strength of the substance by the use of the hydrometer.

The salts of A. A. are known as acetates, and some of them are of considerable commercial importance. Basic copper acetate, or *verdigris*, manuf. by leaving sheet copper in contact with vinegar, is used as a pigment. Lead acetate, commonly known as sugar of lead, is used in the manuf. of the basic carbonate of lead (white lead). Ferric acetate and aluminium acetate are both used as mordants to fix the colours in dyeing and printing calico.

Acetic Ether, or *ethyl acetate* ($CH_3{\cdot}CO{\cdot}OC_2H_5$), a colourless liquid prepared by adding a mixture of alcohol and acetic acid to a mixture of alcohol and strong sulphuric acid, the whole being heated to 140° C. Ethyl acetate is characterised by a pleasant fruity odour, which has led to its being used for flavouring sweets, wines, perfumes, etc.

Acetone ($CH_3{\cdot}CO{\cdot}CH_3$), or *dimethyl ketone*, a colourless mobile liquid produced when isopropyl alcohol loses two atoms of hydrogen by oxidation. It is the simplest member of the fatty ketones.

A. occurs in small quantities in normal urine, but in far greater proportion in cases of *diabetes mellitus* [illegible] produced during [illegible] of wood and [illegible], such as sugar and gum. Crude wood spirit consists mainly of acetic acid, methyl alcohol, and A. After the acetic acid has been removed by the action of lime, the methyl alcohol and A. are separated by fractional distillation. A. is also prepared by the dry distillation of calcium acetate.

A. is miscible with water, alcohol, and ether in all proportions, and is an excellent solvent for many organic [illegible] ders it useful [illegible] e. It is also [illegible] of sulphonal, trional, tetronal (drugs), chloroform, iodoform, and artificial silk.

Acetophenone ($C_6H_5{\cdot}CO{\cdot}CH_3$), *phenyl methyl ketone*, or *acetylbenzene*, a crystalline substance melting at 20° and boiling at 202° C. It is a typical member of the aromatic-aliphatic ketone class of compounds. It is

most conveniently prepared by treating benzene with acetyl chloride in the presence of aluminium chloride. It is employed as a soporific under the name of 'hypnone.'

Acetyl, the organic group which would result by the elimination of hydroxyl from acetic acid; it therefore corresponds to the formula $CH_3 \cdot CO$. It is unknown in the free state, but is looked upon as the radicle of such compounds as acetyl chloride $CH_3 \cdot CO \cdot Cl$.

Acetylene (C_2H_2), a colourless gas of disagreeable odour (when impure), chiefly important as an illuminant, and in the oxyacetylene blowpipe. It can be synthesised from its elements by an electric-arc discharge between carbon poles in an atmosphere of hydrogen, but this synthesis, though very interesting chemically, is of no commercial importance. A. occurs in small quantities in coal-gas, and is produced during the incomplete combustion of many organic substances, such as coal-gas, methane, ethyl alcohol, etc. The most important method of preparation is by the action of water on calcium carbide (CaC_2).

Calcium carbide is prepared by heating carbon with quicklime in an electric furnace. Under the influence of the high temp., the quicklime is converted into calcium, which combines with the excess of carbon, forming calcium carbide, a white solid when pure. It is difficult to eliminate all the impurities from the substance, and the dangers attending the use of A. were formerly due to the presence of impurities as well as to gnorance of the properties of the as itself.

The method of preparation of A. rom calcium carbide consists simply f bringing it into contact with water. he reaction is somewhat violent and ccompanied with the evolution of considerable quantity of heat. ny types of generators have been vented in which the two substances brought gradually into contact, ner by allowing water to drip vly upon the carbide, or by throw- small quantities of carbide into water.

. burns with a brilliantly lumin- flame equivalent to about 240 les for 5 cub. ft. of gas consumed. quality of the light approximates at of sunlight and renders its use ntageous when colour work has done by artificial light. It with air an explosive mixture is much more dangerous than ture of coal-gas and air. The e of the explosion is much , and the limits of explosion vider, as an explosive mixture is formed by mixing any quan from 3 to 82 per cent. of A., while coal-gas the limits are from 5 to per cent. Copper combines with to form an explosive compound, that if copper gas fittings are u they must be kept well greased prevent contact. The flame of burning in oxygen reaches a ve high temp. (about 3000° C.); the ox acetylene blowpipe is therefore e tensively employed in engineerin and metal-working.

A. finds some use as an anæsthet (under the name of 'narcylene'), and is also the source of valuable non-inflammable solvents such as *Westro-sol* ($CCl_2:CHCl$).

Acevedo, Cristobal de (*fl.* 16th cent.), Spanish historical painter, was *b.* at Murcia. He was trained by Carducci at Madrid, and many of his paintings may be found in churches and convents of Spain.

Achæa, one of the anct. great divs. of the Peloponnesus, now the Morea, extending from the R. Larissus along the coast of the Corinthian Bay to Sicyonia. It is a narrow strip of land bounded on the S. by the Arcadian Mts., and watered by numerous small streams, many of which are dry in summer. The coast is low and has few good ports. It was originally called Ægialos, afterwards Ionia, sometimes Ægialeian by the Achæi, afterwards occupied cities or states, consisting of twelve conquest of Greece, Achæa comprised all Peloponnesus with N. Greece, S. of Thessaly.

Achæan Confederation or League, *see* ACHÆI.

Achæi (Achæans), one of the chief Hellenic races, originally dwelt in Thessaly, and thence migrated to Peloponnesus, the whole of which became subject to them with the exception of Arcadia, and the country afterwards called Achaia. Homer frequently calls the whole Gk. race A. When the Heraclidæ and Dorians conquered Peloponnesus, many of the A. under Tisamenus, son of Orestes, went to the N. coast of Peloponnesus, expelled the Ionians, and called the country Achaia. The A. settled in the twelve cities Pellene, Ægira, Ægæ, Bura, Helice, Ægium, Rhypæ, Patræ, Pharæ, Olenus, Dyme, and Tritæa, which formed a league for mutual protection, but they played but a small part in affairs until c. 251 B.C. In 281 B.C. they renewed their league to shake off the Macedonian yoke under which they had been subject. Thus commence the famous Achæan Confederation or League. In 251 B.C. Aratus united to it his native tn., Sicyon. Corinth, Megaris,

Epidaurus, Trœzen, and Sparta also joined, and the league became the chief political power in Greece. It was, however, destroyed by the Romans, who under L. Mummius defeated Diæus, the Achæan general, and burned Corinth (then the chief tn. of the league) to the ground, 146 B.C. S. Greece then became the Rom. prov. of Achæa.

Achæmenes, the first independent king of a Persian prov., until then beneath Medean authority, and founder of the dynasty of Achæmenidæ, to which belonged Cyrus, Cambyses, Darius, Xerxes, Artaxerxes, and others.

Achæmenides, or **Achæmenidæ**, the name of the dynasty of Persian kings founded by Achæmenes.

Achamoth, or 'lower wisdom, according to the Gnostic system of Valentinus, was the daughter of *Sophia* (Wisdom), and by her union with matter produced the Demiurge, or Architect of the Universe.

Achard, Franz Karl (1754–1821), Ger. author of Fr. origin, wrote works on experimental physics, chemistry, and agriculture; was the first to manuf. sugar from beet-root; and became director of the physical class at the Academy of Sciences, Berlin.

Achates, accompanied Æneas in his wanderings after the siege of Troy. In Virgil's *Æneid* he is called 'Fidus Achates,' which is now the term used for any faithful companion. Achates is also the name of a riv. in Sicily.

Aché, Comte d' (1700–75), a most incompetent Fr. vice-admiral of the time of Louis XV., who allowed the British fleet to wrest from him some of the Fr. possessions of S. India.

Acheaon, an Algerian mt. in the prov. of Algiers on which are the ruins of Taza, the famous stronghold of Abd-el-Kader. Alt. 5700 ft.

Acheloiades, a name sometimes applied to sirens and nymphs in general as daughters of Achelous.

Achelous, the largest riv. in Greece, rises in the Pindus Mts. and flows S. into the Ionian Sea, its length being from 120 to 140 m. At its mouth are the Echinades Is. mentioned by Homer, Herodotus, and Thucydides. The god of this river, the son of Oceanus and Tethys, and the eldest of his 3000 brothers, fought with Hercules for Deïanira, was conquered, took the form of a bull, again conquered, Hercules taking one of his horns, which, however, he recovered by giving up the horn of Amalthea. The Naiads changed the horn taken by Hercules into the horn of plenty (Ovid, *Met.* ix. 87). Achelous was considered to be a great divinity throughout Greece.

Achenbach, Andreas (1815–1910), a Ger. painter, was *b.* at Cassel, Sep. 29, and studied at Düsseldorf, under Schadow, becoming one of the most remarkable representatives of the school formed by that master. His work consisted almost entirely of landscape paintings—sites in Holland, especially on the canals, the North Sea, the Alps, Norway, Italy, and the Rhine. The titles of some of them are: 'Hardanger Fjord,' 1843; 'Pontine Marshes,' 1846; and 'Fish Market at Ostend,' 1866.

Achenbach, Oswald (1827–1905), the brother of Andreas Achenbach, was also a landscape painter, his works consisting almost entirely of Italian scenes. Most of his pictures are in the Ger. museums, but the Luxembourg Museum, Paris, possesses his 'Pier of Naples.'

Achene (from Gk. ἀ, without χαίνειν, to gape), a dry, seedlike fruit containing only one seed. The fruits of the Ranunculaceæ are true As., and may be seen on the head of a buttercup and in the strawberry, etc.

Achensee, Lake, the largest and most beautiful lake of the N. Tyrol. It gives rise to the R. Achen, and on its banks are the vils. of Achensee and Achenthal. Its length is 5¼ m.

Achenwall, Gottfried (1719–72), Ger. economic, was *b.* at Elbing, and was claimed to be the founder of statistics as a distinct science. His chief works are: *Elements of Statistics of the Chief Countries of Europe*, 1749, and *Principles of Political Economy*, 1761.

Acheron, the name of sev. rivs.: 1. A trib. of the Alpheus in Elis. 2. A riv. in Thesprotia, Epirus, flowing through Lake Acherusia into the Ionian Sea (Livy, bk. viii. ch. xxiv.). 3. A riv. in Bruttii, S. Italy, on which Alexander of Epirus perished (Livy, bk. viii. ch. xxiv.). 4. A riv. in the lower world, round which the shades hover (Virgil's *Æneid*, bk. vi.).

Acherusia, a name given by the Gks. and Roms. to different lakes, marshes, and caverns which were supposed to be connected with the lower world. The Acherusian Marsh in which Acheron finds its source is in Epirus; the Lago di Fusaro into which Acheron is said to throw itself is in Campania.

Achéry, Jean-Luc d' (1609–85), a Fr. Benedictine monk, *b.* at St. Quentin. His chief work is a collection of documents concerning eccles. history entitled *Spicilegium*, 1653–77. Also collaborated with Mabillon in the *Acta Sanctorum* of the Benedictines.

A-cheval position, the position taken up by troops on either side of a river or road.

Achi Baba. A hill in Gallipoli, 709 ft. high, 6 m. from C. Helles.

In the Gallipoli Campaign 1915 it marked the limit of the British advance. On its slopes Turkish forces numbering 200,000 men, protected by masses of artillery and machine guns, in an elaborate trench-system easily withstood repeated attacks by the British 29th and the Anzac Divisions, notwithstanding supporting fire from the British ships.

Achiet-le-Grand, a village and rlwy. junctn. in Somme Dept., France, which, in the Great War, was taken by General Byng's army in 1917; recaptured by the Germans in the Somme battle of 1918, and finally retaken by Gen. Byng on Aug. 21, 1918. Near it is Achiet-le-Petit, also hotly contested in the Somme battles.

Achievement, *see* HERALDRY.

Achill, or Eagle Island, off W. coast of Mayo, Ireland. The soil is little cultivated, and the island is mountainous. Pop. 5260.

Achillas, minister of the Egyptian king, Ptolemy XII., with Lucius Septimius murdered Pompey, and was himself put to death by Arsinoë, Ptolemy's sister, in 47 B.C. *See* Cæsar, *De Bello Civili*, iii. 4.

Achillea (from *Achilles*, who received knowledge of the properties of plants from Chiron), a genus of plants belonging to the Compositæ. *A. millefolium*, or common milfoil, is found only in colder climates of the N. hemisphere.

Achilles, the hero of Homer's *Iliad*, was the son of Peleus, king of the Myrmidones in Phthiotis, Thessaly, and of the Nereid Thetis. He was educated by Phœnix in eloquence and the arts of war, and by Chiron, the centaur in the healing art. He was the bravest of the Greeks in the Trojan war, leading his troops of Myrmidones, Hellenes, and Achæans in fifty ships against Troy. His quarrel with Agamemnon about the beautiful Briseïs caused him to discontinue his part in the war. Patroclus, however, persuaded Achilles to allow him to go to the war with Achilles' men and armour, and it was not until Patroclus was slain by Hector, the Trojan commander, that Achilles returned to the war. He then killed many Trojans, including Hector, whose body he gave up to Priam, the father of Hector. The *Iliad* closes wth the burial of Hector; but Achilles was killed in the battle at the Scæan gate before the capture of Troy. In character he was gentle towards his friends, obedient towards the gods, fierce in battle, and unrelenting in his anger and revenge when roused. There are many other traditions with regard to his history, but Homer's account is the best known.

Achilles Tatius, Gk. poet, *b.* in the fourth century A.D. at Alexandria, wrote *Leucippe and Cleitophon*, a romance in 8 vols. He later became a Christian bishop.

Achilles Tendon, *see* TENDON OF ACHILLES.

Achilleum, a tn. on the promontory of Sigæum in the Troad which was said to contain the tomb of Achilles.

Achillini, Alessandro (1463–1512), surgeon and philosopher, *b.* and *d.* at Bologna, was one of the first to dissect the human body. His chief works are: *Corporis humani anatomia*, Venice, 1516, and *Anatomicæ annotationes*, Bologna, 1520.

Achillini, Giovanni Filoteo (1466–1538), Italian poet, brother of Alessandro, was also *b.* at Bologna. His highest poetical works, all pub. at Bologna, are: *Il Viridario*, 1513; *Il Fedele*, 1523; *Annotazioni della lingua volgare*, 1536.

Achimenes (from Gk. ἀ, without, χειμών, winter), a genus of plants of the order Gesneraceæ much cultivated for their flowers. Sev. species are found in tropical America and W. Asia. They grow by means of their rhizomes, the leaves are variegated, and the flowers are various-coloured.

Achin, *see* ATCHIN.

Achiri (from Gk. ἀχειρής, without hands), flat-fish which constitute the genus Achirus and differ from soles by the absence of pectoral fins. They inhabit the warmer seas, and are valued as food.

Achish, a Philistine king of Gath who sheltered David when he fled from Saul. He was put to death by the latter. *See* 1 Sam. xxi.

Achitophel, the same as Ahitophel, a native of Giloh, Judea, and one of the most prominent counsellors of King David. Later he assisted Absalom in his rebellion (2 Sam. xv. xvi.). He committed suicide by hanging, owing to the failure of his plans through the advice of Hushai (2 Sam. xvii.). The name is used by Dryden to denote the Earl of Shaftesbury in his famous political manifesto, *Absalom and Achitophel*, 1681.

Achlamydeous (from Gk. ἀ, without, χλαμύς, a cloak), or naked flowers, are those which have neither petals nor sepals. Willow catkins consist of such flowers.

Achmite, *see* PYROXENE.

Achondroplasia, rickets (*rachitis*) in the new born; some derangement in the fœtus of the nutritive process resulting in a retardation or abnormality of the development of bone. Many cases are still-born, and those that outlive childhood are peculiarly dwarfed. The cause is insufficiency of lime salts in the cartilaginous tissues, the ends of the bones being particularly affected. This condition

may be brought about by insufficient or unsuitable feeding of the mother, or possibly to the action of micro-organisms.

Achores (from Gk. ἀχώρ, scurf), a term formerly applied to a milky pustule found usually on the faces and heads of infants, followed by a straw-coloured scab.

Achras (from Gk. ἀχράς, a wild pear-tree), a genus of tropical plants belonging to order Sapotæ. *A. sapota* is cultivated in W. Indies for its delicious fruit, which has no real resemblance to the pear.

Achroite (from Gk. ἀ, without, χροιά, the colour of the skin), a colourless variety of tourmaline.

Achromatin (from Gk. ἀ, without, χρῶμα, colour), a liquid plasmic substance in the nucleus of cells or plastids which do not become coloured by reagents.

Achromatism, the condition of a lens in which chromatic aberration is absent; that is, where the object as seen through the lens has no coloured border. *See* ABERRATION, LENS.

Achromatopsia (from Gk. ἀ, without, χρῶμα, colour, ὄψις, sight), or colour-blindness, is the result of some defect in the retina or the nerve-centres causing the person affected to be unable to distinguish between various colours. Sometimes there is one colour-sensation alone; in Daltonism, or red-green blindness, red or green is the unseen colour. Ill-health at times occasions a temporary state of colour-blindness.

Achtyrka, or **Akhtirka**, a tn. of Russia in the prov. of Kharkov, on the R. Achtyrka; pop. 24,000.

Acid, in chemistry, a substance which yields hydrogen ions when dissolved in water: or alternatively (but less comprehensively) a substance containing hydrogen which can be replaced by metals with the formation of salts. The earliest A. known to man was vinegar or dilute acetic A. Hence the notion of acidity (*acidus*, acid) was bound up with that substance (*acetus*, vinegar). Nitric A. and sulphuric A. were known to the alchemists of the middle ages as being capable of dissolving substances otherwise insoluble. In 1668 Tachenius observed that all As. could combine with alkalis to form salts. Boyle was therefore enabled to assert the following properties of As.: 1, they act as solvents; 2, they precipitate sulphur and other bodies from their solutions in alkalis; 3, they turn blue vegetable colouring matter red, which can be turned blue again by addition of an alkali; 4, they combine with alkalis to form neutral salts. Lavoisier divided all substances into As., bases, and salts, the chemical characteristic of As. being that they were produced by oxygenation. It was pointed out by Berthollet that prussic A. and sulphuretted hydrogen acted as As., but did not contain oxygen, and Davy in 1808–10, by investigating the nature of hydrochloric A., helped to overthrow the oxygen theory, which gave place to a dualistic conception by which As. were divided into two classes, oxyacids and hydracids, their salts being known as amphid salts and haloid salts. Later, Berzelius enunciated his electro-chemical theory that in chemical combination there is neutralisation of opposing electricities. Every compound is thus divided into two parts, one positive and one negative. Sodium sulphate, for instance, was looked upon as soda and sulphuric A., each of these being again divisible into two parts. The effects of electrolysis, however, did not confirm this theory. In 1838 Liebig investigated organic As., and as a result propounded the theory that As. were simply compounds of hydrogen, the replacing of which produced salts. Further, some As. contained more than one atom of replaceable hydrogen, so that the formation of different salts of the same metal was explained. As. containing one replaceable atom of hydrogen are known as monobasic; those containing two, dibasic; those containing three, tribasic; and so on.

The great majority of organic As. are characterised by the presence of a carboxyl group, CO·OH, and their basicity is determined by the number of carboxyl groups. The principal groups of organic As. are the aliphatic and aromatic As. The aliphatic As. may be looked upon as derivatives of the paraffins, the alcohols, and the aldehydes; the aromatic As. are derivatives of benzene. Organic As. yield metallic salts with bases, and esters (formerly known as 'ethereal salts') with alcohols.

Some As. are used in medicine in a dilute form; when strong many of them are powerful poisons. They enter largely into manufs., over two million tons of sulphuric A. alone being produced every year. For the properties and uses of particular As. the separate headings may be consulted.

The chief inorganic As. are: Boracic, carbonic, chromic, hydrochloric, hydrobromic, hydriodic, nitric, nitrous, phosphoric, phosphorus, sulphuric, sulphurous, and sulphuretted hydrogen.

Organic As.: Acetic, benzoic, citric, formic, gallic, lactic, malic, oxalic, palmitic, salicylic, stearic, tartaric.

Among organic As. not containing a carboxyl group may be noted

hydrocyanic (prussic) A. (HCN), cyanic A. (HO·CN), thiocyanic A. (HS·CN), picric A. ($C_6H_2[NO_2]_3OH$), and uric A. ($C_5H_4N_4O_3$).

The strengths of As. are compared by measuring their hydrogen-ion concentrations at equivalent dilutions.

The acidity of a liquid is often represented in terms of the symbol p_H, which stands for $-\log[H^{\cdot}]$, where $[H^{\cdot}]$ is the hydrogen-ion concentration in gram-equivalents per litre. A knowledge of the p_H of liquids is often very important in medicine, agriculture, biology, food-analysis, etc.

Acidalius, Valens (1567–95), commentator and Latin poet, *b.* at Wittstock, Brandenburg, wrote excellent commentaries on Quintus Curtius and Plautus, but his poetry is of little worth.

Acid-amides, compounds which may be regarded as being derived from ammonia by the substitution of the acid or acyl groups for atoms of hydrogen. They are called primary, secondary, tertiary, etc., according to the number of atoms of hydrogen displaced. The chief are *acetamide* and *formamide* (*q.v.*).

Acidaspis (from Gk. ἀκίς, a point, ἀσπίς, a shield), a fossil belonging to the Trilobites, found in the Wenlock limestone.

Acidimetry, the quantitative estimation of acids. It is usually affected by neutralization with alkaline solutions of known strength.

Aciliagens, a famous plebeian house of the Romans, of which the different branches bore a special surname; the three chief names were Glabrio, Balbus, and Aviola.

Acilius, Glabrio (Manius), Roman general, of the Acilia gens, became consul in 191 B.C. During his consulship he subdued Antiochus of Syria at Thermopylæ, and also the Ætolians and Bœotians. He celebrated his triumph in Rome in 190 B.C., and a golden statue was erected in his honour.

Aci-realē, a tn. of Catania, Sicily, at the foot of Mt. Etna, and at the mouth of the R. Acis. It contains mineral waters, and trades in linen, silk, wine, fruit, sulphur, and wax. Pop. 35,000.

Acis, a Sicilian shepherd, was the son of Faunus and the nymph Symethis. He was killed by a rock from Etna by Polyphemus, the Cyclop, his rival in the love of Galatea. Neptune changed him into the stream Acis at the prayer of Galatea. *See* Ovid, *Metam.* xiii. 750–968.

Ackermann, Conrad (1710–71), a celebrated Ger. actor. He excelled in comedy, and helped to improve the German stage.

Ackermann, Johann-Christian-Gottlieb (1756–1801), Ger. physician, was *b.* in Upper Saxony and *d.* at Altorf. He studied at Jena and Göttingen, and became professor of chemistry, pathology, and therapeutics at the University of Altorf. He pub. sev. medical works and some lives of famous Gk. physicians.

Ackermann, Louise Victorine Choquet (1813–90), a Fr. poetess of strength and originality, but of pessimistic philosophy. Her chief works are: *Contes*, 1855; *Premières poésies*, 1863; *Poésies philosophiques*, 1874; *Pensées d'une solitaire*, 1883. *See* Anatole France's *La vie littéraire*, 1892.

Ackermann, Rudolph (1764–1834), *b.* in Schneerberg, Saxony, came to London in 1795, and opened a print-shop in the Strand. He founded an important lithographic press, and pub. the *Repository of Arts, Literature, and Fashions*, containing coloured blocks. In 1823 he originated some pretty pocket-almanacks under the name of *Forget-me-not*.

Ackworth, *see* PONTEFRACT.

Acland, Sir Henry Wentworth Dyke (1815–1900), Radcliffe librarian, Oxford, for over forty years, and had much to do with the founding of the Oxford University Museum. Pub. at Oxford a memoir on cholera, 1854; *Village Hearth*, 1884.

Aclinic (Gk. ἀ, without, κλίνειν, to bend) **Line**, known also as the magnetic equator, is an imaginary line passing round the earth where there is no inclination of the magnetic needle.

Acne, a common, usually chronic inflammatory disease of the sebaceous glands associated with the hair follicles, occurring mostly about the face, chest, and back. The lesions may be papular (consisting of hard pimples), or pustular (containing matter). The disease occurs usually between the ages of puberty and twenty-four years, is usually worse in winter, and is associated with menstrual and gastro-intestinal troubles. The individual lesions consist of pink, pointed pimples in the centre of which there is a black-topped comedo, or blackhead. Occasionally a parasite, *Demodex folliculorum*, is found in each comedo. Treatment consists of steaming the face and then expelling the blackhead by the use of a small tube. Gentle friction is helpful, and irritation should be allayed by the application of cold cream.

A. rosacea is a distinct disease from the above. It is marked by great redness of the nose accompanied by the formation of pimples. Although often called 'brandy-nose,' it may occur in connection with any

derangement of the general health in quite abstemious persons, and is often associated in women with the period known as 'change of *life*.' Treatment usually depends on the predisposing cause, but *local* applications of soothing ointments are beneficial.

Acœmetæ (Gk. ἀ, without, κοιμάσθαι, to sleep), an order of Gk. monks founded about the middle of the fifth century who divided among themselves their service in such a manner that it

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Acolhuas, a tribe of Central Mexico which is said to have founded the settlement of Tezcoco. They were a peaceable people, second in greatness only to the Aztecs.

Acollas, Pierre Antoine René Paul Emile (1826–91), Fr. politician and professor of law, was *b.* at La Châtre, and held most advanced republican views. In 1870 he was given the chair of law at Berne University. *Les enfants naturels*, 1871, is among his best works, and his *Manuel de droit civil*, 1869; he commenced the series of *Le droit mis à la portée de tout le monde* in 1885.

Acolytes (from Gk. ἀκολουθεῖν, to follow) were youths—in holy orders—who assisted and waited on the bishops and priests, performing such offices as lighting the candles, and carrying the bread and wine at communion. These services are now performed by laymen and boys.

Aconcagua: 1. A province in Chile, S. America, the cap. of which is San Felipe. It is very mountainous, being bounded on the E. by the Andes. Area about 6000 sq. m.; pop. 480,678. 2. A mt. peak of the Andes, on the frontier of Mendoza, Argentina, and Chile. It is an extinct volcano, and is the highest peak in S. America, rising to a height of between 23,000 and 24,000 ft.

Aconcio, Giacomo (*c.* 1500–*c.* 1566), Latin *Jacobus Acontius*, Italian theologian, was *b.* at Trent and *d.* in London. He became a convert to Protestantism, and dedicated his *Strategemata Satanæ*, 1565, to Queen Elizabeth.

Aconite, Winter, the *Eranthis hyemalis*, a species of Ranunculaceæ which is common in England. The flowers, each growing on a single stalk, appear early in the year before the leaves.

Aconitin, a vegetable alkali found in aconite which is one of the most powerful poisons known. It is inodorous, intensely bitter, and produces a tingling sensation which causes it to be useful in the treatment of neuralgia, gout, rheumatism, and heart affections. As a poison it causes death by asphyxiation.

Aconitum, a genus of plants belonging to the Ranunculaceæ, all species of which are poisonous. They are hardy, herbaceous plants, many of them of great beauty, and may be recognised by the galeate, or helmet-shaped posterior sepal. *A. napellus*, the monkshood, a common Brit-



ACONITUM NAPELLUS

ish flower, is one of the most deadly species; *A. ferox*, the *Bikh* or *Bish* of Nepaul, contains the fatal Bikh poison in its *root*. In England A. is often called *wolf's-bane*, and in France *tue-loup*, or *kill-wolf*.

Aconitum, Properties of. As plants of this genus are of a poisonous character and contain the alkaloid *aconitin*, great care must be taken to use only *A. napellus* in medicine. The leaves, when chewed, produce a tingling sensation, but the root causes numbness as well as tingling. It diminishes the rate of the pulse and the heart-beats when taken internally, but leaves the brain unaffected. For internal use it is in the form of tincture or extract, and is employed as a sedative to the stomach, and as a relief in fevers and nervous diseases; for external use it is formed into ointments or liniments, and relieves neuralgia. In cases of aconite poisoning, the stomach must be immediately emptied, until when no stimu-

lants should be given; artificial respiration and application of hot-water bottles to the extremities will also probably be necessary.

Acontias, a genus of reptiles of the order Sauria and family Scincoid without limbs. They have heads like those of lizards, while their scaly bodies and unequally developed lungs resemble those of serpents. They are found at the Cape of Good Hope.

Acontius, a beautiful youth of the Is. of Ceos. In order to gain the love of Cydippe, the daughter of a noble Athenian, he threw before her, while she was sitting in the temple of Diana, an apple, on which he had written: 'I swear by the sanctuary of Diana to marry Acontius.' Cydippe read aloud the words, and threw the apple away; but the goddess had heard her vow, and when she was about to marry another man she was so ill that her father gave her in marriage to Acontius. Ovid, *Heroides*, 20, 21.

Aconz, Stefan Köver (1740–1824), Armenian abbot and writer, was *b.* in Transylvania and *d.* in Venice. In 1800 he was chosen abbot of the convent of St. Lazarus at Venice, the centre of Armenian learning, a position which he held until his death. He pub. sev. theological works.

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Acouchi, popular name of the *Dasyprocta acuchi*, found in Guiana and the is. of St. Lucia and Granada. It differs from the other agoutis (*q.v.*) in possessing a tail of about 2 in. in length instead of a mere tubercule.

Acoustics, a term formerly applied to that branch of physics which deals with phenomena associated with sound waves. In recent years, however, there is a tendency to restrict its use to those properties which make a room or hall suitable or otherwise for hearing music and oratory. Sound waves are movements in the air which proceed in all directions from the source. The quality of the sound as heard by the audience is affected by reflection from the surfaces of objects in the building. It may be thought that the larger the number of objects the greater the disturbance will be, but the fact is that with small objects the wave-length is not small in comparison with the apertures through which they pass, the surfaces by which they are reflected, and the obstacles round which they flow. The bad As. of a building are due to large surfaces and large apertures. In a large, bare hall, for example, there is considerable reflection from the roof and walls, so that the sounds heard are mingled with the echoes of those gone before. If the hall is large and has no peculiarities of structure, these

echoes may be dissipated into negligible small waves by breaking up the surfaces with drapery, and by the floor being well occupied with chairs and people. All auditors of a concert ought to be in view of the performers to get the right effect, because if the sound waves have to flow round obstacles the small waves are cut off so that the quality of the music is changed. Every one has experienced the change in the effect of the music when a band comes round the corner. At first one hears the drums and heavy instruments; the lighter clarionets, piccoli, etc., only contributing their proper effect when the band comes in full view.

The whispering gallery, which is such an interesting feature of some churches, illustrates the effect of echoes; a whisper at one focus of an ellipsoidal roof is reflected at all points in the roof, bringing all reflections to a focus at one point, with the result that the whisper appears magnified many times. The problem of constructing a building with good As. is somewhat difficult to solve, because the building must be up before its qualities in that respect can be demonstrated. Sensitive flames may [illegible]used to distinguish the effect of [illegible]arge obstacles and apertures, but experiment in these matters has led to no very satisfactory results. The best way out of the difficulty is to construct a hall after the same design as one which is known to possess good A. qualities.

Acqua, Cesare dell' (1821–1905), Italian painter, was *b.* at Pirano in Istria. [illegible] at first of his [illegible] subjects, but he [illegible] taste for the ge[illegible]

[illegible] in Viterbo, Italy, built on a precipitous mass of rock. It was the native place of Girolamo Fabrizio, an anatomist and professor of the sixteenth century; and has been the see of a bishop since 1850. Pop. 6085.

Acquaviva, a tn. in Bari, S. Italy, at the foot of the Apennines; pop. 10,871.

Acquaviva, Andrea Matteo, Duke of Atri (c. 1460–1528), politician and man of letters, was *b.* in Naples. He fought for the liberty of his country, and when peace was restored became a patron of learning, and wrote a treatise on Plutarch's *Moralia*.

Acqui: 1. A province in N. Italy, producing corn, fruit, and wine. 2. The chief tn. of the prov. of Acqui. It contains a fine old cathedral, churches, convents, and other buildings, and is the see of a bishop. Its hot sulphur springs are famous (known to the Romans as Aquæ Statiellæ). Here Napoleon defeated the Austrians, 1796. Pop. 15,250.

Acquiescence, a term in Eng. and Scots law which may be explained thus: When a person A sees another B infringing or about to infringe his rights, of which rights he, A, is fully aware, and when he, A, remains quiescent in such a way as to lead B to reasonably believe that A assents to his, B's conduct, then A is held to have acquiesced in the infringement of his rights and the courts will not hear his complaint. It is also acquiescence if the aggrieved party has failed for a length of time to make objection to an action. To submit, however, to an injury does not take away the right to bring an action, if the injury is done without knowledge or assent.

Acquisti, Luigi (1744–1824), Italian sculptor, was *b.* at Forli. The scenes of his labours were Bologna, Rome, and Milan, and his masterpiece is a group of 'Venus and Mars.'

Acquittal (from Fr. *acquitter*, to free or discharge), the setting free by a court of a person charged with a crime. In an Eng. court there must first be a verdict of 'Not guilty,' in a Scotch court of 'Not guilty' or 'Not proven.' A. by a jury must, however, be confirmed by the judge. If after an A. the person is again charged with the same offence, and if he can prove that he has been formerly acquitted (or pardoned) he is entitled to be discharged.

Acquittance is the discharge in writing of a debt, or sum of money due. Notwithstanding the production of a receipt or A. in full of all demands, a court may, upon proof of fraud or mistake, order accounts to be gone into again.

Acragas, a celebrated Gk. engraver in silver who lived about the fifth century B.C.

Acraspeda (Gk. ἀ, without, κράσπεδον, a fringe), a sub-order of the Cœlenterata, distinguished by the thickness and stiffness of the umbrella, at the edge of which are sev. indentations containing sense organs.

Acre (A.S. *æcer*, Ger. *acker*, Dutch *akker*, Danish *ager*, Latin *ager*, Gk. ἀγρός), originally meant an open, ploughed, or sowed field. In England it also meant an open field until the times of Edward I. and Edward III., when an Eng. statute acre consisted of 4840 sq. yds. A chain is 22 yds. long, so that 1 sq. chain = 22 × 22 or 484 sq. yds., *i.e.*, one-tenth of an A. An A. is divided into 4 roods, a rood into 40 perches, and each perch contains 30¼ sq. yds. In the reign of George IV. the A. was fixed for all land measurements throughout the United Kingdom. This is also used in the U.S.A. The old Scotch A. is

larger than the Eng. A., and the Irish is larger than the Scotch.

Acre, St. Jean d', or Akka (anct. name Acco, called Ptolemais during the sovereignty of the Gks. in Syria), a tn. on the coast of Syria, built on a small promontory which, with Mt. Carmel to the S., forms a circular bay. It was taken by the Crusaders, 1104; retaken by Saladin, 1187; taken by the Crusaders under Philip Augustus of France and Richard I. of England, 1191, and given to the Knights of St. John; fell into the hands of the Egyptians, 1291; taken by the Turks, 1517; besieged by Bonaparte for sixty-one days, 1799, but was saved from assault by Jezzar Pasha and Sir Sydney Smith; taken by Ibrahim Pasha, 1832; taken by the English, Austrians, and Turks, 1840, Ibrahim Pasha returning to Egypt. Afterwards it was restored to the Turks. In the combined British and Arab offensive against the Turkish armies which was begun on Sept. 19, 1918, under General Allenby, A. was seized, together with Haifa, on Sept. 23. A. is a seaport and exports grain, oil-seeds, olive-oil, and wool. Pop. 6400.

Acrel, Olof (1717–1807), Swedish surgeon, who was *b.* and *d.* at Stockholm. He entered the Fr. army in 1743 in the capacity of army-doctor. He wrote several surgical works.

Acrelius, Israel (1714–1800), Swedish clergyman, was *b.* at Osteraker and *d.* at Fellingsbro. He was educated at Upsala and became a pastor in America; in 1759 he pub. a history of the Swedish colonies in America.

Acri, a tn. in Calabria Citra, S. Italy; pop. 12,686.

Acridine, $C_{13}H_9N{\cdot}2H_2O$, an organic compound found in crude coal-tar anthracene and utilised in the manuf. of dyestuffs. It is a crystalline solid, melting at 108° C.

Acrisius, son of Abas, King of Argos, grandson of Lynceus, and great-grandson of Danaus. He kept his daughter Danaë shut up in a subterraneous apartment, or in a brazen tower, because it was declared that her son would kill his grandfather. When Danaë became the mother of Perseus, Acrisius ordered them both to be put in a chest on the sea. They were rescued by Dictys near the Is. of Seriphus.

Acrobat (from Gk. ἄκρος, on high, and βαίνειν, to go), literally means one who walks on tiptoe, but it is the name given to one who performs such dangerous feats as vaulting, tumbling, and walking or dancing on a slack or tight rope. As. were known to the Gks. and Roms., especially for the performance of feats on the rope. During recent years great skill has been exhibited in this art, and the names of Farioso, Madame Saqui, Diavolo, and Blondin are well known.

Acroceraunia, a promontory in Epirus, jutting out into the Ionian Sea, traversed by the Ceraunii Montes and ending in the present Cape Glossa. The coast of A. was dangerous to ships, whence Horace speaks of 'infames scopulos Acroceraunia,' the rocks of ill-fame. *Odes*, i. 3.

Acro-Corinthus (Gk. ἄκρον, a peak), a steep rock, about 1900 ft. high, which is near the city of Corinth, in Greece. It contains the ruins of the acropolis, anct. fortifications, a temple of Aphrodite, and the famous well, Pirene.

Acroculia, a name given by Phillips to a fossil mollusc of the Gastropoda, found in the Palæozoic strata. It is allied to the Neritidæ. Conrad gives it the name Platyceras.

Acrodus (from Gk. ἄκρος, at the top, ὀδούς, tooth), a fossil fish found in the Triassic system.

Acrogaster (from Gk. ἄκρος, at the top, γαστήρ, belly), a genus of fossil fish of the Berycidæ, found in the Cretaceous system.

Acroleïn, or Acraldehyde ($CH_2{\cdot}CH{\cdot}CHO$), a colourless liquid formed during the partial combustion of fats. The disagreeable smell produced when a tallow candle is extinguished is due to the formation of A. It is an unsaturated aldehyde, boils at 52°, has an irritating action on the skin, and its vapours cause a copious flow of tears.

Acrolepis, a genus of fossil fish found in the Permian system.

Acromegaly (from Gk. ἄκρος, extreme, μέγας, great), a nervous disease for which no cure is known, occurring in adults, characterised by the enlargement of the soft tissues and bones of the extremities.

Acromion (from Gk. ἄκρος, extreme, ὦμος, shoulder), the apophysis which terminates in man the spine of the scapula, or shoulder-blade; articulates with the extremity of the clavicle, or collar-bone, and gives attachment to the trapezoid and deltoid muscles. *See* SHOULDER.

Acron, a celebrated physician of the fifth century, who was *b.* at Agrigentum in Sicily.

Acron Helenius, Rom. grammarian who wrote commentaries on Horace, Perseus, and Terence. The century in which he flourished is unknown.

Acronychal (from Gk. ἄκρος, extreme, νύξ, night), a word used only in reference to the rising and setting of a planet or star. A star has its A. rising and setting when its rising takes place at sunset and its setting at sunrise. The opposite of the term is cosmical.

Acropolis (from Gk. ἄκρος, highest, πόλις, city), a fortified hill, rock, or elevation of anct. Greece. Among these strongholds were the A. of Corinth, called Acro-Corinthus; that of Larissa at Argos; of Mt. Ithome at Messene; of Thebes, called Cadmea; but the chief was the A. of Athens. This (called also Cecropia) was a rock about 150 ft. high, 1150 long, and 500 broad, which in early times had been partially surrounded by the Pelasgian wall. Here the first kings of Athens built their palace, and a temple of Athene, the Hecatompedon, existed before the Persian invasion. Later edifices were the Parthenon the Pro-



THE ACROPOLIS, ATHENS

pylæa, designed by Mnesicles 437 B.C., a temple of Nike Apteros, the Erechtheum, the sanctuary of Artemis Brauronia and the Pinacotheca. Many of the ... were brought ... Elgin in 181... *pole d'Athèn*... *l'Acropole*, 18.. ; Botticher's *die Acropolis von Athen*, 1888; Penrose's *Principles of Athenian Architecture*, 1888; D'Ooge's *Acropolis of Athens*, 1909.

Acrosalenia (from Gk. ἄκρος, at the end, σάλος, restlessness), a fossil belonging to the Saleniidæ of the Dia... ...e Jurassic, Lias, ... systems.

... ...κρος, at the end, στίχος, a line or row), a verse or set of verses whose initial letters form a word, a phrase, or even a sentence. In the *Spectator* Addison notes compound As. in which the end letters have formed the same word as the initial one, and sometimes the same letters have run like a seam through the middle of the verse; it has been found possible to form a pentacrostic even, in which the same name occurs five times in so many columns. This poetical conceit is of anct. date, Bishop Eusebius (*d.* 340) giving in his *Life of Constantine* a set of Gk. verses, said to have been composed by the Erythræan Sibyl, of which the initial letters formed the words Jesus Christos Theou uios Soter—Jesus Christ, the son of God, the Saviour—the word itself formed the A. *ichthys*, a fish, which thus came to have a mystical meaning. Each div. of the 119th Psalm contains eight verses, each set of eight beginning with the same letter, *aleph*, *beth*, etc. The comedies of Plautus are each preceded by an argument, the initial letters of which, when joined, read as the title of the play, and the Fr. poets from Francis I. to Louis XIV. partook of this literary trifling. The best-known Eng. As. are contained in Sir John Davies's *Hymns to Astræa*, in praise of the queen, which consists of twenty-six poems, each of which forms with its first letters the words *Elisabetha Regina*.

Acrotatus (*d.* 264 B.C.), son of Areus, succeeded to the throne of Sparta in 265 B.C. Before his accession he successfully combated Pyrrhus, king of Epirus, in the siege of Sparta, 272 B.C.; in the year following his accession he was killed in battle against Aristodemus, tyrant of Megalopolis.

Acroterion (from Gk. ἀκρωτήριον, extremity), in architecture, a statue, vase, or other ornament placed on the apex or a lower angle of a pediment. The term is sometimes applied to the pedestal on which the ornament stands.

Act. In drama, that portion of a play which is divided from other portions by an interval, or *entr'acte*. In the Gk. drama there was no such div. of play, for if the prin. actors were not on the stage the chorus was,

but the Roman, like the present-day dramatists, utilised the break in presentation to imply passage of time. Roman dramatists like Plautus and Terence always wrote their comedies in five As., as in later times did Shakespeare and some other Elizabethans, but modern writers often content themselves with three or four—exposition, development, and conclusion.

In law, when a person executes a legal instrument it is declared to be his *A. and deed.* *As. of Parliament*, from which are derived the statute law of the realm, are joint actions concurred in by the sovereign and both Houses of Parliament. The word is also used to denote the written expression of this will. More generally the word *act* is used to express any proceeding of a public nature, and is derived from the Latin *acta*, which signified the records of public transactions.

A. of Congress.—A bill or resolution which has been passed by both the Senate and the House of Representatives becomes an A. of Congress if accorded the consent of the President. If vetoed by the President and returned for re-consideration, a bill may then become an A. only on being passed a second time by a two-thirds majority in each House. As. of Congress are of two kinds, either public or private, the first being concerned with law and revenue. All resolutions are presented privately by individual [illegible] may originate in [illegible] or the House of Representatives, except those concerned with revenue, which must be initiated in the latter.

A. of God is the term used in law for any untoward occurrence not arising from human cause or negligence, but from natural causes, such as it could not have reasonably been expected to be foreseen and guarded against. Damage by storms, lightning, floods, or exceptionally high tides or sharp frosts, etc., may be attributed to the A. of God, and in the absence of any contract to the contrary, no person can be held liable for it. Nearly all insurance forms and shipping charter-parties, and most contracts, have a clause in same relating to non-liability in the case of an A. of God.

A. of Grace.—An A. of the Scottish Parliament which compelled creditors to provide food for their imprisoned debtors who were without means of support. It was amended in the reign of George IV., and since the abolition of imprisonment for debt (1880) it has necessarily lapsed.

A. of Parliament.—A law made by the joint action of the three estates of the realm—the lords spiritual, the lords temporal and the Commons; in other words, by the king in parliament. The draft copy of a proposed A. is called a 'bill,' and a bill only becomes an A. when it has received the royal assent. This may be given either by the sovereign in person or by lords commissioners. A bill may be introduced into either House of Parliament with the exception of what are known as money bills, which the House of Lords may neither initiate nor amend. This practice is based upon the resolutions of the Commons of 1671 and 1678, and until the rejection by the Upper House of the famous [illegible] Budget of 1909 it was [illegible] that the rejection of a money bill was a breach of the privileges of the Commons. The Parliament Act of 1911 definitely laid down this principle by statute, leaving to the speaker of the House of Commons the decision as to what constituted a money bill, and in the case of other bills provided for joint sittings of both Houses in case of dispute and for the final passage of a bill into law without the assent of the Upper House if for three successive sessions it had obtained a majority in the Commons. No bill can be introduced more than once in a session, and it has sometimes been necessary to prorogue parliament in order that a bill which has been rejected may be again reintroduced without delay. A bill may be either private or public. A public bill may be introduced by any member of parliament, but nowadays only gov. bills have much chance of passing into law. Public bills are debated in principle on the first, second, and third reading, and in detail in committee or on report. A private bill, *i.e.* a bill in the interest of some individual or corporation, is introduced by the petition of the parties concerned, and passes through the same stages. If, however, the preamble of a private bill is not 'proved,' *i.e.* if the special committee to which it is referred after its second reading finds that there is no *prima facie* cause for it, it is thrown out. All As. are public unless otherwise stated, they are binding on all, and do not need to be publicly promulgated, every citizen being presumed to know what is in them. The public As. of the United Kingdom do not apply to the crown, the Isle of Man, nor the Channel Is. An A. may be temporary, and many temporary As. (100 or so) are renewed from year to year by the Expiring Laws Continuance Act. An A. remains in force in England until repealed, but in Scotland As. that have never been repealed are sometimes held to have

lost their force owing to lapse of time. In citing an A. the name is given of the sovereign in whose reign it has passed, the year of his reign, and the chapter, *i.e.* the number of the A. among the other As. of the same session. Thus 6 Geo. IV. c. 62 would be cited for the A. passed in the sixth year of King George IV. to amend the A. of Grace (*supra*).

A. of Sederunt.—An ordinance or enactment made by the judges of the Scotch supreme court, the Court of Session, mainly directed to the end of regulating procedure in the courts and expediting the administration of justice. This power was conferred on the judges by King James V. in 1532, and at one time had wide scope, approaching legislative power, but no such power is now claimed by the Scotch judges. A quorum of nine judges was necessary to pass an A. of Sederunt.

A. of Settlement.—An A. passed by a Tory gov. in 1701 in the reign of William III. which had for its object 'The further limitation of the crown, and better securing the rights and liberties of the subject.' It was of great importance in settling the modern constitution of the country and arose out of the need for securing the Protestant succession to the throne. King William and his consort, Mary, were childless, as was also Anne, the heir-presumptive, the elder branch of the Stuarts were dead or Roman Catholics, so the succession was settled on the Electress Sophia of Hanover, a grand-daughter of James I., and her heirs, 'being Protestants.' Her son became George I. In addition to arranging for the succession by a series of eight important articles, the power of the throne was restricted and certain abuses guarded against. Perhaps the two most important were those relating to the appointment of judges (making them practically irremovable), and asserting the right of parliament alone to declare war.

A. of Supremacy.—An A. of 1559, providing that the sovereign should be the supreme head of the realm in spiritual matters. This confirmed the A. of 26 Henry VIII. c. 1, repealed in Queen Mary's reign.

A. of Toleration.—An A. passed in the first year of William III. (1689), and confirmed by 10 Anne, c. 2, by which religious freedom (denied by the A. of Uniformity and the Five Mile Act, etc.) was granted to all dissenters from the Estab. Church except Catholics and Unitarians. The civil disabilities of the latter were not removed till the reign of George III., and of the former were relieved by the Roman Catholic Emancipation Act (10 Geo. IV. c. 7).

A. of Union.—Although the kingdoms of Scotland and England came under one crown when in 1603 James VI. of Scotland became James I. of England, and although Ireland had come effectively under English dominance about the same time, it was not until 1707 that the Scots, and 1801 that the Irish, Parliaments were merged with the Eng. by the two As. of Union. The earlier A. provided that sixteen elected peers and forty-five members of the House of Commons (now seventy-four) should represent Scotland at Westminster, and the latter A. secured for Ireland a representation in the British Parliament of thirty-two peers and 100 members. The Irish representation was subsequently increased to 103; but, since the creation of the Irish Free State, only Northern Ireland is represented, namely by 13 members.

A. of Uniformity.—An A. passed in 1662, in the reign of King Charles II., requiring all ministers to declare their unfeigned assent to the Prayer Book. For failing to do so 2000 were on Aug. 24, 1662, deprived of their livings.

Acta Diurna ('Transactions of the Day') was the title of an official journal pub. daily in Republican and Imperial Rome. It was the nearest approach in anct. times to the modern newspaper, for in addition to official announcements it contained the results of chariot-races, notices of births, marriages, and deaths, etc. During the consulship of Julius Cæsar, 59 B.C., there was pub. for the first time in the A. D. or Senatus, an official report of the proceedings of the senate. This was discontinued under the empire, but the speeches of the emperor were often so reported.

Acta Eruditorum, pub. at Leipzig from 1682 to 1782, was a scientific and literary monthly printed in Latin. The first editor, Otto Mencke, was a professor of the university, and his son and grandson succeeded him in the editorial chair. Among its many able contributors was Leibnitz, who first announced in it his method of differential calculus.

Acta Sanctorum ('Acts of the Saints') is the title of a series of volumes, begun in 1643 and still going on, devoted to recording the lives of the saints and martyrs of both branches of the Catholic Church. The work was projected by a Flemish Jesuit, Heribert Rosweyd, in 1607, but it was not till 1643 that John van Bolland (*q.v.*) pub. the first volumes. Other members of the Jesuit order who aided or continued the work were named Bollandists after their leader. Sixty-five vols. have already appeared.

dealing with the saints in the calendar. The Bollandists received an annual grant from the Belgian gov.

Acta Senatus, the minutes of the discussions and decisions of the Roman senate.

Actæa (from Gk. ἀκτέα), by which was designated the medicinal plant *Sambucus ebulus*, the dwarf elder. Linnæus transferred the name to some plants belonging to the Ranunculaceæ, which are found in America, Europe, and the N. of Asia. *A. spicata*, the bane-berry or Herb-Christopher, well known in England, has a poisonous purplish-black fruit.

Actæon, son of Aristæus, and of Autonoë, a daughter of Cadmus, was a famous huntsman trained by Chiron. Having surprised Artemis bathing with her nymphs, he was changed by the goddess into a stag and devoured by his own pack of fifty dogs. Euripides' version is that he rendered the goddess irate by boasting that he excelled her in hunting. *See* Euripides' *Bacchæ*, l. 330, and Ovid's *Metamorphoses*, bk. iii. ll. 131–252.

Actinia, *see* ANEMONE.

Actiniaria (from Gk. ἀκτίς, ray, ῥαίειν, to break), fossil polypi belonging to the Poritinæ of the Anthozoa, found in the Upper Jurassic system.

Actinism (from Gk. ἀκτίς, a ray), a term formerly used to express the property supposed to belong to certain rays of light—chiefly solar and lunar—by which chemical changes are produced as in photography.

Actinium (Ac), a metal separated out from pitchblende by Debierne. It is radio-active, that is, it emits energy in virtue of its chemical identity, not of any physical relationship to any thing else. Its atomic weight is about 230, and its atomic number is 89. *See* RADIO-ACTIVITY.

Actinocamax (from Gk. ἀκτίς, ray, κάμαξ, a spear), a mollusc belonging to the sub-genus of the Belemnitidæ of the Dibranchiata, found in the Upper Cretaceous system.

Actinoceras (from Gk. ἀκτίς, ray, κέρας, horn), genus of fossil molluscs of Silurian system. It belongs to the Actinoceratidæ of the Nautiloidea.

Actinocrinus (from Gk. ἀκτις, ray, κρίνον, lily), fossil plant belonging to the Actinocrinidæ of the Camerata. It is characterised by its pyriform or ovate calyx and its convex operculum. It is found chiefly in the sub-carboniferous systems of Europe and N. America.

Actinolite (from Gk. ἀκτίς, ray, λίθος, stone), a calcium-magnesium-iron amphibole, obtaining its name because the crystals are arranged in rays. In colour it varies from an olive to a greyish-green.

Actinometer, an instrument invented by Sir John Herschel in 1825 to measure the amount of heat received from the sun upon a given surface in a given time. It consisted of a thermometer with a large cylindrical bulb. Readings were taken in sun and shade, which by subtraction gave the amount of expansion due to direct sunlight. The term A. or actinograph is now applied to many types of instruments used by photographers to estimate the actinic power of sunlight on any given occasion.

Actinomycosis, an infectious, inoculable, parasitic disease, commonly known as 'lumpy jaw' or 'big jaw,' first observed in cattle, and also occurring in man, characterised by chronic inflammation, and often resulting in tumours about the jaws.

Bollinger in 1877 gave a description of the ray-fungus, to which he had discovered the disease in cattle was due. One year later, Israel of Berlin discovered the same disease in man. Infection generally takes place through the mouth, teeth, and pharynx, the microbe generally being introduced with food. From an examination of thirty-two cases, Bostroem concludes that the organism enters in association with certain cereals, chiefly barley; and it is noteworthy that those infected have generally been concerned in occupations dealing with cereals.

Most cases of A. have occurred in connection with the oral cavity. The patient complains of toothache and of difficulty in opening the jaw. A swelling appears at the angle of the jaw, which passes into suppuration, pus being discharged externally and into the mouth. From this the disease may spread downwards into any organ. Pulmonary A. is characterised by a cough and fœtid expectoration, which on examination reveals the presence of the *actinomyces*. The organism may also infect the intestines, where it grows upon the mucous membrane, leading to ulceration. Perforation of the serous coat of the bowel may occur, leading to peritonitis.

The diagnosis of the disease rests solely upon the discovery of the *actinomyces*. The hardness of the borders of the ulcers and of the neighbouring muscles in oral A., and the yellow granules in the pus are indications, but must not be considered conclusive until the identification of the microbe.

The course of the disease is chronic. Mild cases may recover in from six to nine months, oral A. being the most favourable. Pulmonary A. is usually fatal, death resulting from pyæmia.

The treatment is mainly surgical, the part involved being excised with

a free use of disinfectants. Potassium iodide is used internally, often with success.

Actinozoa, in zoology, a class of the Cœlentera, animals of a low type of organisation, distinguished by conspicuous radial symmetry. They are divided into two sub-classes, Zoantharia and Alcyonaria, the former including sea-anemones, stony corals, and black corals, and the latter the precious red coral, sea-fans, and sea-pens.

The sea-anemone, which may be taken as a typical example, has a broad base by which it attaches itself to a rock, a cylindrical column beset with warts or tubercles, and an upper disc which is encircled by numerous tentacles. In the middle of the disc is the mouth, which leads to a gullet communicating with the stomach cavity, from which other cavities radiate. The animal partly paralyses its prey (small fishes, sea-urchins, etc.) by the use of stinging capsules, and ingests it whole. The corals are distinguished by the formation of a calcareous skeleton.

The class is sometimes known as *Anthozoa.*

Action. In the limited legal acceptation of the term the word signifies a proceeding in a civil court of law with the object of ascertaining and fixing the rights and duties of two parties. Every person, other than a felon, outlaw, or foreign enemy, has the right to bring an A., either directly or, in the case of legal minors or lunatics, indirectly through their guardians, against any other person except the sovereign, foreign sovereigns, and their representatives. The proceedings in the various courts are different, and certain As. can only be brought in courts for that specific purpose, but the main features are substantially the same in the courts of England and Scotland. The defendant is served with a summons directing him to appear in court, next an attempt is made to ascertain the facts of the question at issue, and when this is determined to endeavour by argument, either supported by evidence or without, to settle which of the parties is in the right. On matters of fact the verdict of a jury is generally considered final, but a judgment on a question of law is generally open to appeal. The expenses or *costs* of an A., though sometimes shared, are usually ordered to be paid by the loser of the A., but in order to prevent abuse the loser may submit these costs to an officer of the court, called a taxing master, who, for a fee, audits or 'taxes' the costs. Either party has the right to demand trial by jury, common or special, except in causes assigned to the Chancery Div., or where the judge by Order 36 of the Supreme Court Rules decides otherwise. Formerly the word 'suit' was used instead of 'A.' when the case was one for *equity, i.e.* in the Chancery Div. The word 'suit' has now been abolished, the powers of equity (*q.v.*) being conferred on the High Court by the Judicature Acts of 1873–5, but certain As., such as those for execution of trusts and performance of contract, can only be brought in the Chancery Div. The Scots law never recognised a formal distinction between law and equity, so it is competent to bring all As. before the Court of Session, if we except certain applications which must be made to the Inner House. The old Eng. common law used to divide As. into three classes, *real, personal,* and *mixed* As., but the modern classification is now into As. for breach of contract (*ex contractu*) or for *torts* (*ex delicto*). An A. founded on a tort, *i.e.* any wrong done that is not in the nature of a breach of contract, falls broadly under one of three headings, *nonfeasance*, the omission to do what one ought to do, *misfeasance*, the improper performance of a lawful act, *malfeasance*, the performance of an unlawful act. Scottish As. are also broadly divided as follows: declaratory, to define the nature and extent of the rights of the pursuer; rescissory, to set aside or rescind a fraudulent or erroneous document; petitory, to sue for debt or damages for breach of contract; and possessory, for an injunction restraining from interference with property, in other words, for the maintenance of the *status quo.* An *A. upon the case* signifies an A. under the common law prior to which particulars of the wrong complained of, or the case, were set down in detail.

As in English, so in American practice and procedure, fixed forms of A. have been abolished by the majority of jurisdictions. For these, there is now one single form for all causes. This is the outcome of what is called the 'Field Code' of 1848, so called because it was framed principally by the labours of David Dudley Field (*q.v.*), who was appointed in 1847 to revise practice and procedure in New York State. This code was [illegible] pedantry or outworn Latin, is pre-eminently in accord with American ideas. This reform also abolished the distinction between common law forms of A. and other forms, and, like English procedure after the Judicature Act of 1873, it enabled equitable and legal remedies

to be provided by one and the same court. But there is no actual fusion of law and equity any more than there is in English procedure. (*See under* EQUITY.) For the rest, though American procedure is so largely derived from the English, there is considerable difference arising from the fact that the Federal and States courts still follow their several systems of procedure.

Action, Least, Principle of, *see* MAXIMA and MINIMA.

Action and Re-action (Motion, Laws of), *see* NEWTON, MOMENTUM.

Actisanes, an anct. King of Ethiopia, who conquered Egypt in the reign of Amasis.

Actium, now Akri, tn. and promontory at the entrance of the Ambracian Gulf on the W. coast of Greece. It is celebrated as the scene of the final overthrow of Antony and Cleopatra by Augustus, on Sept. 2, 31 B.C. Apollo, from his temple on the promontory, received the title of Actius or Actiacus. For description of battle *see* Dion Cassius, bk. i.

Active or Living Force (*vis viva*). *See* ENERGY.

Acton, municipal bor. of Middlesex, 9 m. W. of St. Paul's. It was a seat of Puritanism at the time of Cromwell, and was the place of residence of Richard Baxter. Henry Fielding, the novelist, and Mrs. Barry, the actress, also resided here. Pop. 61,299.

Acton, John Emerich Edward Dalberg-Acton, first baron (1834–1902), Eng. historian, grandson of Sir J. F. E. Acton, was *b.* at Naples on Jan. 10, 1834. He studied under Dr. (afterwards Cardinal) Wiseman at Oscott, but received chief teaching from Dr. Döllinger, and became leader of Eng. 'Liberal Roman Catholics.' In 1895 he was appointed regius professor of modern history at Cambridge, in which year he pub. his *Lecture on the Study of History*. On Newman's retirement in 1859 he ed. the *Rambler*; in 1862 the *Home and Foreign Review*. His *History of Freedom in Antiquity* appeared in 1877, and he projected, but did not live to see the accomplishment of, the *Cambridge Modern History*, 1902–10. He was a devoted admirer of Gladstone, and his *Letters to Mary, daughter of the Rt. Hon. W. E. Gladstone*, have been ed. by Herbert W. Paul with an introductory memoir, 1904. *See* also *Lord Acton and His Circle*, ed. by Abbot Gasquet, 1906.

Acton, Sir John Francis Edward, Bart. (1736–1811), was *b.* at Besançon, the son of an Eng. physician. He entered the Tuscan navy, and reorganised the Neapolitan navy, becoming *generalissimo*, Minister of Finance, and Prime Minister at Naples. In 1791 he succeeded to his cousin's title. In 1798 he fled with King and Queen of Naples to Palermo on account of Fr. invasion, but resumed his power on the king's restoration in 1799. In 1806 he again fled with the royal family, and *d.* at Palermo on Aug. 12, 1811.

Acton Burnell, Statute of, passed in 1283 by a parliament which assembled in the parish of this name in the eleventh year of King Edward I. The passing of this statute was indicative of the growing importance of the mercantile class, and its object, as set forth in the preamble, was to make provision for the more speedy recovery of debts. *Inter alia* the statute made arrangements for the distraint of the debtor's goods. Acton Burnell is about 8 m. from Shrewsbury, and it is said that the parliament which assembled there met in a barn.

Actor, son of Deion or Myrmidon, was the grandfather of Patroclus, and his descendants were called the Actorides.

Acts of Hostility, breaches of international law which may lead to war.

Acts of the Apostles, The, title of the fifth book of the N.T., the authorship of which is attributed to St. Luke, the physician, the writer of the third Gospel. The As., like that Gospel, are dedicated to one Theophilus, reference being made to him in the first verse of each book. There is an identity in literary style between the Gospel and the As., and early tradition, nowhere contradicted, assigned the authorship of the Gospel to a companion of St. Paul. It was probably written between 63 and 69 A.D. for the author records the arrival of St. Paul in Rome, but not his death. The As. form the chief source of early Christian history, their authenticity has never been seriously questioned, and they were recognised by all parties in the early church as canonical. The book was written in Gk., and is divided into two parts, the first twelve chapters dealing with the church in Jerusalem and Judæa, with St. Peter as the central figure, and the second, written often in the first person plural, treating of the church among the Gentiles and the journeys of St. Paul. Baur, the most considerable critic of this work, has seen in it support for his theory that the early church was divided into two factions, the Judaistic, or followers of Peter, and the more liberal or Pauline party. He has even gone to the length of suggesting that the As. of the Apostles was intended to be an eirenicon between the school of Paul and that of the older apostles. Peter, says Baur, is made to speak the lan-

guage of Paul, and Paul's attitude to the Judaisers appears much more conciliatory than it really was. Perhaps the most considerable supporter of the traditional authorship of the As. is Sir William M. Ramsay, whose scholarly work *St. Paul the Traveller* has done much to redress the balance of criticism. As. was not quoted often, nor very early, but Papias, who was bishop of Hierapolis in Phrygia in the earlier half of the second century, probably was acquainted with it, as he refers to Philip the Deacon and his daughters (Acts xxi. 9), and Justus Barsabas (Acts i. 23). On the other hand, Eusebius, the biographer of Papias, does not report him as quoting As. Irenæus, Tertullian, Hippolytus, and Clement of Alexandria quote the As. frequently, and echoes of it are to be found in the writings of Ignatius, Polycarp, and others.

Actuarius, John, a Gk. physician and writer who lived about the thirteenth century. He is said to have introduced certain drugs into Europe.

Actuary (from Lat. *actuarius*), which signified the clerk or shorthand writer who in ancient Rome recorded the *acta* (proceedings) of the senate or other public bodies. The word passed into England and came to mean the secretary or accountant of a public company, or the clerk or registrar of a court. In the latter sense it is still used for the officer who keeps the minutes of the Lower House of Convocation in the prov. of Canterbury. Now the word is used in a more restricted sense, and practically only applied to an official of a gov. dept. or an insurance company or friendly society whose duty it is to make the calculations on which are based the premiums or charges made for all forms of insurance. From the foregoing it follows an A. will be skilled in the mathematical laws of probability, and he generally has some legal knowedge, also a certain amount of medical knowledge, to enable him to benefit to he full by the advice tendered by the ompany's medical officers as to 'good' nd 'bad' lives. In 1819 the gov. reated the post of A. to the Commisioners of the National Debt, and the riendly Societies Act of the same ear attempted a legal, albeit somehat vague, definition of an A. in the ords, 'a person skilled in calculaon.' The number of gov. As. was iturally greatly increased by the ational Insurance Act, 1911, and e work of an A. becomes increasgly more onerous. Many As. have nsultative practices, and the affairs the profession are managed by two orporated societies. The more portant, *The Institute of As.*, was inded in 1848 and incorporated in 1884, the other body, *The Faculty of As. in Scotland*, founded in 1856 was incorporated in 1868. Both bodies grant diplomas, and their members are respectively entitled to the letters F.I.A. and F.F.A. after their names.

Aculeus, or prickle, is an emergence of a plant formed from the epidermis and partly from other tissues; *e.g.* the nose-prickle. It may serve as a defence against enemies or as a means of climbing to the light.

Acuna, Cristoval de (1597–*c.* 1650), Jesuit missionary, was *b.* at Burgos and *d.* in Peru. He wrote an account of [illegible] ration down the [illegible] ared in 1641 as [illegible] *del gran rio de* [illegible] *Amazonas.*

Acuna, Hernando de (*c.* 1500–80), Spanish soldier and poet. He served in Charles V.'s expedition against Tunis, was a friend of Garcilasso de la Vega, and his poems were pub. posthumously in 1591 as *Varias Poesias.*

Acuna, Don Pedro Bravo (*d.* 1606), Spanish general, and governor of the Philippine Is. He recaptured the Moluccas from the Dutch in 1606, in which year he died at Manilla.

Acupressure (from Lat. *acus*, needle, *premere*, to press), a method formerly used of compressing an artery with a needle to arrest a hæmorrhage. The needle is placed perpendicularly to the artery near its opening, crossing over it firmly, and thus stopping the flow of blood.

Acupuncture (Lat. *acus*, a needle, *pungere*, to prick), in surgery, puncture of the skin with a needle for the exit of fluid, the relief of pain, etc. It was long used by the Chinese, who believed that by such an operation the harmful vapours which gave rise to certain disorders were exuded from the body.

Acusilaus, one of the oldest Gk. historians, said to have flourished about 540 B.C.

Adachev, Alexis (*d.* 1561), chamberlain to Tsar Ivan IV., the Terrible, whose violent passions he influenced beneficially. He distinguished himself at the taking of Kazan, 1552, but later fell into disgrace and died in prison at Dorpat.

Adachev, Daniel (*d.* 1561), Russian general, and brother of Alexis Adachev, conducted a successful expedition in the Crimea, 1559, but later shared his brother's disgrace and was executed at Moscow.

Adagio (from It. *ad agio*, leisurely), in music, a term indicating that the movement is very slow. It is also used as the name of a piece of music, or as the distinguishing title of a single movement.

Adair, James (*fl.* 1775), trader and

historian of the American Indians, emigrated to America in 1735. He adopted the theory that the American Indians, among whom he lived for forty years, came from the lost ten tribes, a theory subsequently elaborated by Dr. Boudinot in his *Star of the West*, 1816. *His History of the American Indians*, dealing with their language, habits, and character, is a valuable and interesting work.

Adair, Sir Robert (1763–1855), diplomatist, was educated at Westminster School and Göttingen University. He entered parliament as member for Appleby and Camelford, and was a follower of Charles James Fox. He has left memoirs of his diplomatic career as ambas. to Vienna, Constantinople, and Brussels in his *Historical Memoir of a Mission to the Court of Vienna in 1806* (1844), and *Negociations for the Peace of the Dardanelles in 1808–9* (1845).

Adal, a region of Africa round the Bay of Tanjura. The name is also applied to the inhab. of the dist., otherwise known as the Danakils. They are a Mohammedan race, dark-coloured, woolly-haired, and warlike.

Adalbert, Archbishop of Hamburg-Bremen (*c.* 1000–72), declined the papacy offered by Henry III. and desired to found a patriarchate in the N. He exercised great power over Henry IV., whom he educated, and though the nobles accomplished his expulsion from court in 1066, he was recalled in 1069. He assisted in the conversion of the Wends. See Adam of Bremen's *Gesta Hammaburgensis Ecclesiæ Pontificum*.

Adalbert, Heinrich Wilhelm, Prince of Prussia (1811–73), was the son of Prince Friedrich-Wilhelm-Charles, and cousin german of Emperor Wilhelm I. After travelling extensively in Europe and Brazil, he was appointed admiral to the Prussian fleet, but failed to distinguish himself in the wars with Denmark and France.

Adalbert, St. (*fl.* 700), an English saint, traditionally declared to have been first archdeacon of Utrecht, and patron saint of Egmont.

Adalbert, St. (*c.* 939–997), *b.* of a noble Bohemian family, was created bishop of Prague in 982. He preached Christianity to the Hungarians, then to the Prussians and Poles, and was murdered by an unbelieving Prussian priest. He is called the 'Apostle of Prussia,' and his feast is celebrated on April 23. His bones were reinterred n Prague Cathedral in 1880.

Adalia, Attaliyeh, or Satalieh, the net. Attalia, is a seaport of Asia linor on the Gulf of Adalia. Built n the slope of a hill, the streets rise tiers above one another, facing the arbour. It exports fruit, timber, and wheat. Its former impo as a port has been greatly lesse the extension of railways an unsuitability of its harbou modern steamers. Pop. about 2

Adam, the first created ma type of man. The word is prob connected with the Hebrew 'adam,' *red*, and is used as a ge name for man in the Heb. and A rian languages. In Genesis, article is sometimes prefixed sometimes not, giving us two ren ings: 'the man,' as the first crea individual, and 'man,' as a spec It is generally recognised that t dissimilar accounts of the creation A. are amalgamated in the Bib Genesis i.–ii. 3 designates the Deity Elohim, whilst from ch. ii. 4 the co bination Yahweh-Elohim is use rendered in the Eng. version as 't Lord-God.' The story of A. as na rated in the portion characterised b the term Elohim describes his creatio as taking place on the sixth day, afte the plants and animals had alread been made. The more detailed nar rative starting at ch. ii. 4 tells of the formation of man from the substanc of the earth, and his installation in the Garden of Eden, in the midst of which grew the tree of life and the tree of knowledge of good and evil. The fruit of the latter tree was strictly forbidden him, but he was enjoined to cultivate the other plants and enjoy their fruits. The animals were then formed from earth-substance, and were named by A. God afterwards caused a deep sleep to fall upon him, during which Eve was made from his own flesh. Being induced by the tempter to eat of the forbidden fruit, Eve persuaded A. to eat also, and for this transgression of the law of God both were expelled from paradise to become the progenitors of the human race.

Much has been written in discussion of the question as to whether the story of A. was intended as history or allegory, and on its relationship to the theories of modern science. In the first place, it is well to point out that a scientific inquiry like that carried out by Darwin aims at classifying facts in order to arrive at the 'laws' or uniformities of nature, leaving out the questions of creation and the ultimate destiny of man. The Genesis account, on the other hand, is an attempt to describe the relationship of God and man, to indicate the history of the human race in terms of such facts as may be available, with a direct view to formulating a religious code. As the purpose of the writer is the spiritual elevation of mankind, the facts of creation must be looked upon as typifying spiritual

forces, so that history and allegory are blended. Man has his origin in inorganic matter; his very existence therefore depends upon the directing power of an Almighty Being; he is, however, given dominion over the animals, which expresses the separation of species, not as a scientific fact, but as a moral necessity (Lev. xviii. 23). The prohibition of the tree of knowledge of good and evil indicates the distrust of culture characteristic of the Jehovistic writers. The introduction of sin by way of the sex element paves the way for much of the teaching of the Pentateuch. Death as the consequence of ... may also be take[illegible] ... e tendency to ... following upo[illegible] ... law. The narr[illegible] ... y becomes the introduction to the compilation of historical narrative and moral adjuration which we know as the Pentateuch. Many accounts of the creation from other sources contain some of the elements of the Bible story, and it is probable that the original writer selected such items as best illustrated his view of the moral growth of man. Amongst the ancient Egyptians, for instance, it was believed that men were produced from the mud of the Nile under the influence of the sun-god. Babylonian inscriptions describe a garden with four rivers as being connected with an early state of innocence, and there are also indications that the serpent story is of Babylonian origin.

In many versions of the Eng. Bible dates are appended to the different chapters. When dealing with the monarchical period of Jewish history, it is possible to give dates with a fair amount of certitude, and by adding together the years in the generations of the patriarchs, as given in Genesis, ch. v., Bishop Ussher arrived at the date 4004 B.C. as the time of A.'s creation. The value of such a method of computation is now understood to be *nil*; the beginnings of life must have taken place many millions of years ago, and man has been differentiated from the other animals probably for at least 100,000 years.

Later Jewish stories introduced fanciful accounts of A., as that he was of huge proportions, covering the earth completely. His first wife was Lilith, who fled from him when Eve was created and became a demon. In the Manichæan mythology, A. is not represented as a creation of God at all, but as the son of Satan, prince of darkness, by 'Sin,' or 'desire.' Satan had stolen light from heaven, which passed into A., and by diligent fostering by the spirits of good, the prospect of light finally overcoming the power of darkness in man was held out as the great hope of the Manichæan religion. Eve was given to A. by Satan, and represents the sensual element, which was seduced by Satan himself; thus Cain and Abel were said to be the sons of Satan and Eve, the offspring of Adam and Eve being Seth, who thus carried forward the tradition of light.

A Mohammedan account states that A. performed a penance lasting 1000 years in Ceylon. Augustine suggested that the cause of A.'s expulsion from Eden was not that he was tempted by Eve and fell, but that after Satan's victory over Eve, A. was led by the power of love to share her shame and punishment. This idea is adopted in *Paradise Lost*; Milton also used the Rabbinical accounts of the celestial hierarchy, Satan being identified with Lucifer, 'son of the morning,' who had fallen from heaven. Another tradition of the Rabbinical writers is that A. was the author of Psalm xcii., the 'Sabbath Psalm.'

An attempt has recently been made to prove that A. was a so-called palæolithic man, to whom the Creator added pre-natally the moral and spiritual qualities which differentiated neolithic man from his immediate forerunners. (Morris' *New Light on Genesis*, 1926, and *Man Created during Descent*, 1926.)

Adam, Adolphe Charles (1803–56), Fr. operatic composer, studied composition under Boieldieu and wrote many comic operas. Among his best works are *le Châlet*, 1834; *le Postillon de Lonjumeau*, 1836; *le Roi d'Yvetot*, 1842; *Cagliostro*, 1844; *le Toréador*, 1849; and the ballad of *Giselle*, 1841. *See* A. Pougin's *A. A., sa vie, sa carrière, ses mémoires artistiques*, 1877; *Souvenirs d'un musicien*, 1901.

Adam, Albrecht (1786–1862), lithographer and one of the finest painters of Ger. battle-scenes, was *b.* at Nordlingen. He followed Beauharnais in Russia and Italy, and accompanied Radetzky in 1848. Among his best works are *The Battle of Moscow* and *The Battle of Leoben*.

Adam, Alexander (1741–1809), Scottish grammarian and teacher of Latin, was *b.* in Morayshire of humble parents. After a successful career at Edinburgh University, he was appointed assistant to the rector of the High School in 1767, and became rector in 1771. Among his students were Walter Scott, Jeffrey, and Brougham. He received his honorary degree of LL.D. in 1780. His *Principles of Latin and English Grammar*, 1772, was rejected by the school patrons, but his *Roman Antiquities*, 1791, obtained continental

fame. He also pub. a dictionary of *Classical Biography* in 1800, and in 1805 a *Lexicon Linguæ Latinæ Compendiarium*. See A. Henderson's *Account of the Life and Character of Adam Alexander*, 1810.

Adam, James (*d.* 1794), an architect, is known only in connection with his younger brother, Robert Adam (*q.v.*). He is believed to have designed Portland Place.

Adam, Jean (1710–65), Scottish poetess, *b.* near Greenock, is famous as reputed author of *There's Nae Luck aboot the Hoose*. From being prin. of a girls' school she sank into utter poverty, and *d.* in a Glasgow workhouse.

Adam, John (1779–1825), an Anglo-Indian statesman, son of William Adam (*q.v.*). He became secretary to Lord Hastings in India, and acting governor-general in 1823. He suppressed the freedom of the Eng. press in India, provoking a storm by cancelling the licence of James Silk Buckingham. See *Asiatic Journal*, Nov. 1825.

Adam, Juliette (pseudonym of Juliette Lamber), *b.* at Verberie, Oise, in 1836. Married to a lawyer, La Messine, she pub. under that name *Blanche de Coucy, l'Enfance*, in 1858, and followed it up with *Idées anti-proudhoniennes sur l'amour, la femme et le mariage*. After her second marriage in 1868, with Edmond Adam, prefect of police, she pub. largely under her maiden name, among her later works counting *le Siège de Paris*, 1873; *Laïde*, 1878;
Grecque, 1879; *Païenne*, 1883. She
ounded *La Nouvelle Revue* in 1879,
nd her *salon* was politically in-
luential. See *Le roman de mon en-
ance et de ma jeunesse*, 1902; *Mes
remières armes littéraires et politiques*,
904; and *Mes sentiments et nos idées
ant 1870* (1905). *Mes Illusions et
os souffrances durant le siège de Paris*,
06; *Mes angoisses et nos luttes*,
07; *La Vie des âmes* (sketches of
ropean War), 1919; *L'Angleterre
Égypte*, 1922; *L'Égypte: Une
on diplomatique*, 1924.

Adam, Paul-Auguste-Marie (1862–
20) Fr. novelist, *b.* 1862 in Paris,
s father was 'directeur des postes'
ler the Second Empire. A. was a
ulangist in the later eighteen-
ties, and an unsuccessful candidate
deputy. His first book was the
nësque *Chair molle*, 1885; the
nd, *Soi*, 1886, a study of feminine
sm. He devoted himself to
rical investigation—distinguish-
between stories of his own day
oque) and those of a former time
temps et la vie). He wrote:
s rouges, 1891; *Le Mystère des
es*, 1895; *La Bataille d'Uhde*,
1897. Then came four romances of
the Napoleonic time—*La Forc*
1898; *L'Enfant d'Austerlitz*, 1902
La Ruse, 1903; and *Au Soleil d*
Juillet, 1903—in which he was greatl
assisted by the recollections of hi
grandparents. Other works: *L*
Trust, 1910; *La Ville inconnue*, 1911;
Stéphanie, 1913. He *d.* in Paris,
Jan. 2, 1920.

Adam, Robert (1728–92), Scottish architect, was *b.* at Kirkcaldy, the son of an architect. With C. L. Clérisseau, the Fr. architect, he visited Italy in 1754, and subsequently wrote *Ruins of the Palace of the Emperor Diocletian*, 1764. On his election as M.P. for Kinross in 1768, he resigned his office of architect to the king and queen, but still pursued his professional career. With his brother James he built the Adelphi, which is thus named after them (from Gk. ἀδελφοί, brothers). Other examples of their work, recorded in their *Works in Architecture*, 1773–78, are the screen to the Admiralty Office; Lord Mansfield's house at Caen Wood; the Register Office, Edinburgh; Lansdowne House, London; Glasgow Infirmary, and part of the buildings of Edinburgh University. See P. H. Fitzgerald's *R. A., Artist and Architect*, 1904; J. Swarbrick's *Life, Work, and Influence of R. A.*, 1903.

Adam, William (1751–1839), politician and lawyer, son of John A. and nephew of Robert and James A. (*q.v.*). He entered parliament in 1774, and attached himself to Lord North's party. In 1779 he fought a duel with C. J. Fox, wounding him slightly, and later becoming his firm friend. He assisted in the impeachment of Warren Hastings in 1788, took silk in 1796, and was appointed lord commissioner of Scottish Jury Court, 1816. His friendship with Sir Walter Scott is chronicled in Lockhart's *Life*.

Adam de la Halle (*b.* 1240, *d.* 1285–88), a native of Picardy, known as *The Hunchback of Arras*, a celebrated *trouvère*. He wrote *Le jeu Adam*, or *Le jeu de la Feuillée*, the first Fr. comedy, and at the court of Naples he composed the first known comic opera, *Le jeu de Robin et de Marion*, c. 1283. A complete ed. of his works, by Coussemaker, appeared in 1872.

Adam of Bremen, the Ger. historian and geographer, was *b.* in the eleventh century, but the dates of his birth and death and definite particulars of his life are unknown. In 1068 he was made canon of Bremen Cathedral under Archbishop Adalbert (*q.v.*), and prin. of the cathedral school. From the years 1072–76 he was engaged in writing the *Gesta Hammaburgensis Ecclesiæ Pontificum*, his history of

Hamburg and the spread of Christianity in the N.; the best ed. of this book is by Lappenberg, 1876. He *d.* on Oct. 12, probably in 1076.

Adam (sculptors), a famous Fr. family of sculptors, comprising Jacob-Sigisbert A. (1670–1747), an executor of religious subjects, and his three sons, all natives of Nancy. Lambert-Sigisbert (1700–59) went to Paris in 1719, and after four years' study gained the *prix de Rome*. At the command of Pope Clement XII. he executed [illegible] he pearing [illegible] ap- became [illegible] and St. Luke [illegible] of *La Seine et la Marne* at St. Cloud, are *Neptune et Amphitrite*, 1740, at Versailles; *Vénus au bain*, 1742, for the Château de Choisy; and two marble groups, *La Chasse* and *La Pêche* now at Potsdam. He pub. in 1754 a *Receuil de scu*[illegible] *et romaines.* [illegible] 78) went to [illegible] and became academician for his *Prométhée déchiré par un vautour*, 1762, now in the Louvre. His other works are *Le Martyre de Sainte Victoire*, 1743, and the tomb of Catherine Opallinska, 1749, in Nancy. François-Balthasar-Gaspard (1710–61) also obtained the *prix de Rome*, but afterwards lived in Berlin as sculptor to the King of Prussia from 1747–59. His works were of mythological subjects, such as *Apollon*, 1748, and *Diane au bain*, 1756. All four died in Paris.

Adamant (Gk. ἀδάμας, unbreakable), now used only poetically for a hard substance, was formerly synonymous with a diamond, and also by false etymology connected with the lodestone.

Adamantine Spar, or Corundum, an aluminium-oxide, the mineral substance ranking second to the diamond in hardness, is found in various coloured and colourless forms. Some coloured varieties used as gems are the sapphire, oriental ruby, oriental topaz, oriental amethyst, oriental emerald, while emery is a dull granular specimen. It is found in China, India, Canada, and some parts of Europe.

Adamawa, or Fumbina, a state of Central Sudan, traversed by R. Benue, with Yola for its cap. It contains good pasture-land and is well populated, but has an unhealthy climate; the loftiest peak is Mt. Alantika, 6000 ft. high. Its possession is shared by France, Germany, and Britain without boundaries to show ...rs. Pop. 3 to 4 millions. *See* Passarge's *Adamaua*, 1895.

Adamites, the name of a Gnostic sect of the second century in Africa, who sought to re-establish the innocent state of man at the time of the creation, going naked and rejecting marriage. The doctrine was prevalent among some of the Beghards or Brethren of the Free Spirit in the fourteenth century, and a similar sect appeared in Bohemia and Moravia in the fifteenth century. They were massacred by Ziska in 1421.

Adamnan, or Adomnan, famous as the author of the *Biography of St. Columba*, was *b.* about 625, of a race called Hy-Neill, in Ulster. He received his education at the monastery of Clonard. In 679 he was appointed abbot of the Columban Brotherhood at Iona. While visiting his pupil Aldfrid, King of Northumbria, he became converted by the Venerable Bede to an acceptance of the Rom. observances at Easter, and to the adoption of the regulation tonsure. He endeavoured to inculcate the same change of view among the brotherhood, but failed, although some success attended similar efforts in Ireland. In 704 he died. Among his works is a Latin discourse entitled *On the Holy Places*. Another work is *Adamnan's Vision*. The work that stands out as the most significant, both in its value in literature and for its enlightenment, is his *Biography of St. Columba*. The best ed. is by Dr. Reeves, for the Bannatyne Soc. 1874.

Adams, Charles Francis (1807–1886), American diplomatist, son of John Quincy A. (*q.v.*), *b.* at Boston, Massachusetts. Studied diplomacy under his father at an early age in Russia and England, and returning to Harvard graduated in 1825. Studied law, and sat in the [illegible] House o[illegible] Sat as a [illegible] appointe[illegible] in 1862 [illegible] of the *Alabama*, and succeeded in influencing Lord John Russell in stopping the *Alexandra* and two ironclads intended for the Confederate states. He left England in 186[illegible] and sat at the Geneva Conference (1871–2). He edited the works of John Adams (1850–6) and the memoirs of John Quincy Adams (1874–7). See *Life* by his son, C. F. Adams, Jr., 1900.

Adams, Charles Francis (*b.* 1866), great-[illegible] of John Adams, [illegible] the U.S.A. Born [illegible], Aug. 2, 1866. Educated at Harvard, and then practised law. Mayor of his native city 1896–7. Treasurer Harvard University Corporation 1895–1929. Was amateur navigator on the yacht *Resolute* when it won International Yacht races 1920. Named by President Hoover to cabinet post of Secretary of the Navy, March 1929.

Was one of the American delegates to the London Naval Conference in January–March 1930.

Adams, Clement (*c.* 1519–87), author and schoolmaster, was *b.* in Warwickshire, educated at Eton and Cambridge. He pub. an account of Richard Chancellor's voyage to Russia in his *Anglorum Navigatio ad Moscovitas*, 1589, the first Eng. venture into that country.

Adams, Francis (1796–1861), an Aberdeenshire physician and classical scholar. His chief pub. are: *Hermes Philologus*, 1826; *Arundines Devæ*, 1853; trans. of *Hippocrates*, 1849, and *Aretæus*, 1856.

Adams, Franklin Pierce, *b.* Chicago, Illinois, Nov. 15, 1881. One of the best-known journalists in America, being everywhere labelled by his initials, simply 'F.P.A.' Has for years conducted a jesting and satirical column of prose and verse in the *New York World* under the caption 'The Conning Tower.' Has published many books of light verse.

Adams, Henry Brooks (1838–1918), American historian, grandson of sixth president of the United States; *b.* Boston. Grad. Harvard, 1858. Travelled in Europe 1858–60; in England 1861–68 as sec. to his father, Chas. Francis A., the American Minister. His *History of the United States from 1801 to 1817* (pub. 1889–90) is a standard treatise. Wrote besides many essays and studies, a *Life of Geo. Cabot Lodge*, and a brief autobiog. called *The Education of Henry Adams* (1918). *D.* at Washington.

Adams, John (1735–1826), second president of the United States, was *b.* at Quincy, Norfolk co, Massachusetts. Educated at Harvard (1755), he was called to the bar in 1758. He was one of the Mass. representatives to the Congress in 1774, and a promoter of the Declaration of Independence, 1776. He became ambas. to Holland, 1782; to Great Britain, 1785; president of the United States, 1797–1801. He pub. a *Defence of the Constitution of the U.S.* in 1787. *See also* UNITED STATES—*History*. *See* bibliography to *Works*, ed. by C. T. Adams, 1850–56; *Letters of Abigail and John Adams*, 1840–41; *Familiar Letters of J. Adams to his Wife*, 1876; M. Chamberlain's *John Adams*, 1898; J. T. Morse's *John Adams*, 1885.

Adams, John Couch (1819–92), astronomer, was *b.* near Launceston. He and Leverrier share the honour of having discovered Neptune in 1846 after noting the irregularities in the motion of Uranus. In 1860 he was appointed professor of astronomy at Cambridge.

Adams, John Quincy (1767–1848), sixth president of the United States and eldest son of John Adams (*q.v.*), second president, was *b.* in Quincy, Norfolk co., Massachusetts. He studied diplomacy in Europe under his father in 1778; returning to America he graduated at Harvard, 1787. He became ambas. to the Hague, 1794; to Prussia, 1797; to Russia, 1809; to London, 1815; secretary of state of the U.S.A., 1817; president, 1825–29; defeated by Jackson in 1829, he returned to Congress in 1830. See *Memoirs of J. Q. Adams*, ed. by C. F. Adams, 1874–77; *J. Q. Adams*, by J. T. Morse, 1883; *The Adams Family*, by Jas. Thurlow Adams, 1930. *See also* UNITED STATES—*History*.

Adams, Maude (*b.* 1872), *b.* in Salt Lake City, Utah. Her mother being an actress in a stock company, Maude began playing child parts at a very tender age, becoming in her young womanhood one of America's favourite actresses. Created for the first time in America many of the star-parts in plays by Barrie and Edmond Rostand. Is an intimate friend of Sir James Matthew Barrie.

Adams, Samuel (1722–1803), an American statesman, was *b.* at Boston, Massachusetts, U.S.A., and graduated at Harvard College, 1740. He took the popular side in the disturbances caused by the Stamp Act, 1765, and in the same year was made a member of the legislature of Massachusetts. He signed the Declaration of Independence, 1776, became lieutenant-governor, 1789–94, and governor until 1797, of Massachusetts. He devoted his life to the cause of the independence of America, and wrote political essays. He was called 'the American Cato.'

Adams, Thomas, a Puritan preacher who flourished from 1612 to 1653, was called by Southey 'the prose Shakespeare of Puritan theologians.' He wrote sermons and theological works, and from 1612–23 held the positions of preacher at Willington, Bedfordshire, vicar of Wingrave, Buckinghamshire, and preacher at St. Gregory's under St. Paul's Cathedral.

Adams, William (1575–1620), an Eng. navigator, was *b.* at Gillingham, near Chatham, and was apprenticed as a sailor when twelve years old. He became pilot-major to a fleet from Rotterdam which, though bound for India, reached Japan, where A. lived until his death, becoming second in command of an Eng. settlement founded 1613, and making voyages to Siam and Cochin China.

Adams, William (1814–48), was educated at Eton and at Oxford, became a fellow and tutor, 1837, and vicar of St. Peter's, Oxford. He

wrote *Sacred Allegories*, *The Shadow of the Cross*, *The Fall of Crœsus*, and *Cherry Stones*.

Adams, tn., Berkshire co., Massachusetts, U.S.A.; manufs. cotton, wool, and paper. Pop. 13,525.

Adam's Apple. 1. In common parlance, the boss or projection caused by the thyroid cartilage of the larynx, chiefly marked in the male. 2. In botany, is the *Citrus limetta*, or sweet lime, a pale yellow, roundish fruit with a boss at the point. Its name, *Pomo d'Adamo*, was given by the Italians, who thought the depressions on the surface resembled the mark of Adam's teeth. It belongs to the Rutaceæ, the orange and lemon family.

Adam's Bridge, Indian Ocean, is a chain of sand-banks which with the Is. of Manaar and Rameswaram extend from Ceylon to the S. coast of India. It has sev. navigable channels for small boats, and a railway is under consideration. In the *Ramayana* it is said to have been constructed by the monkey-god Hanuman for the passage of Rama from Madras to Ceylon.

Adam's Peak, the highest point of Ceylon, is 7420 ft. high. It obtains its name from the popular Mohammedan belief that [illegible] ice here after [illegible].

Adamson, [illegible], was prin. of Edinburgh University, 1625–53; professor of philosophy at St. Andrews University, and professor at Edinburgh, 1589–1604. He became vicar of N. Berwick and of Liberton; ed. *The Muses' Welcome* to James VI. on his return to Scotland, 1617, and was the author of sev. poems and theses.

Adamson, Patrick (1537–92), a Scottish prelate, was *b.* at Perth, graduated M.A. at St. Andrews, 1558, and became minister of Ceres in Fife, 1563. In 1566 he went to France, returning about 1572, when he became minister of Paisley, chaplain to the regent, and archbishop of St. Andrews, 1576. He came into conflict with the church, was sent as ambas. to Elizabeth by James VI., 1583, was charged with heresy and excommunicated, 1585. He was afterwards pardoned, [illegible] 1588. He [illegible] theologica[illegible] and verse.

Adamson, Robert (1852–190?), was [illegible] 1876, [illegible] wrote [illegible] works, including some on philosophical subjects, the chief of which are: *Roger Bacon*; *The Philosophy of Science in the Middle Ages*, 1876; *On the Philosophy of Kant*, 1879; and *The Philosophy of Fichte*, 1881.

Adamson, Thomas, a master-gunner, wrote *England's Defence, a Treatise concerning Invasion*, 1680.

Adana, a vilayet (area 15,500 sq. m.; pop. 137,915) and city in Asia Minor. The city is situated on the Sihoon about 30 m. from the coast of the Mediterranean. It exports wool, cotton, and grain, and is a railway station. Pop. 64,110.

Adanson, Michel (1727–1806), a Fr. naturalist, was *b.* at Aix, and *d.* at Paris. He was placed at the university, and was destined for the church, but gave up the study for that of natural history. In 1748 he went to Senegal, where he remained for five years, making collections in every branch of natural history. His *Natural History of Senegal* was pub. in 1757; he became a member of the Academy of Science, 1759; and his *Families of Plants* appeared 1763. He then commenced to compile an *Encyclopædia of Natural History*, but was reduced to misery and poverty during the Fr. Revolution. He was, however, invited to become a member of the Institute of France, and received a small pension from the Fr. gov.

Adansonia, *see* BAOBAB.

Adapis, a mammiferous fossil found in the plaster-of-Paris quarries of *Montmartre*, given this name by Cuvier. The bones are incomplete, the dentition is reduced, and the animals, which belonged to a family of extinct lemurs, were about the size of a rabbit.

Adaptation (*adaptare*, to fit to), the process of acquiring a fitness for new circumstances or new purposes. In literature and music, the term is used to denote the modification of some form of art to allow of its suitable expression in another form. Thus we speak of the A. of a play from a novel; or of a poem to music, where certain stanzas are omitted to suit the considerations of length usually called for in a song.

In biology, A. means the variations in the structures of animals occasioned by the necessity for continuing to live or procreate under somewhat altered circumstances. The term is sometimes carelessly used as if it meant a kind of conscious striving after fitness, but when we say that a frog is adapted to its surroundings, we simply mean that it cannot live the life, say, of a cod-fish. In the process of evolution of a species, variation in characteristics occurs in two ways. First, there is the influence of heredity, which tends to perpetuate certain characteristics, perhaps in the direction of the parent away from the type, or as reverting to the type away from the parent. If

the direction taken is one that leads to survival, the animal lives to carry on what is perhaps a long process of A. But every individual has a certain power of reacting to its environment, and tends to alter itself in its own life-history. If the variation achieve the object of survival, it may be called an A. Thus we may say that every distinctive characteristic originated in an A., even when it is being slowly modified in the direction of extinction, for such modification is the response to the demand for an economy in which all that is useless must be abandoned.

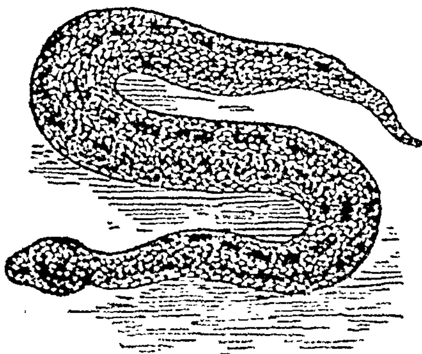
Adar, the last month of the Heb. year, corresponding to our February. Veadar (lit. 'and Adar') was the intercalary month introduced into seven of the cycle of nineteen years.

Adda (Rom. Addua), a riv. in Lombardy, rises in the Rhætian Alps, near Bormio, enters Lake Como, traverses the plain of Lombardy, and flows into the Po about 8 m. above Cremona. Length, 182 m.

Addams, Jane, American sociologist, *b.* at Cedarville, Ill., 1860. Studied economic questions in Europe and America; in 1889 she helped to found in Chicago Hull House (a social settlement. *See* her work, *Twenty Years at Hull House* (1910)). For three years she held the post of inspector of streets and alleys. See *Democracy and Social Ethics* (1902); *Newer Ideals of Peace* (1907); *The Spirit of Youth and the City Streets* (1909).

Addax, a genus of antelopes belonging to the Hippotraginæ and allied to the oryx, found in N. Africa and Arabia. The *A. nasomaculatus* is a large animal with a white band round its muzzle, called by the Arabs *Abou-Addas* and by Pliny *Strepsiceros* on account of its twisted horns.

Adder (A.-S. *nædre*, an adder, now changed to an adder), a name applied to sev. poisonous snakes of the Viperidæ and to some non-poisonous Colubridæ. *Vipera* (or *Pelias*) *berus*, the European A., attains a length of 28 in., and its bite is seldom fatal. Wyclif applies the term to the serpent in the Garden of Eden.



ADDER

Adder's Tongue, the popular name for the fern *Ophioglossum vulgatum*, belongs to the Ophioglossaceæ, and is found in Britain. It develops only one leaf each year, and reproduces vegetatively by means of buds on the root.

Addington, Henry, *see* SIDMOUTH.

Addis Abeba, a tn. of Shoa, Abyssinia, containing the palace of the wife of Menelek, who here signed a treaty with Italy on Oct. 26, 1896. The stationary pop. is about 50,000, and the floating pop. about 30,000.

Addiscombe, a district of Croydon, Surrey, contained the college for cadets of the E. India Company in which were trained sev. notable men, among others Sir Henry Lawrence, Lord Napier, and Lord Roberts. Pop. 11,246.

Addison, Joseph (1672–1719), essayist, poet, and statesman, was *b.* May 1, 1672, at Milston rectory, near Amesbury, Wiltshire, the son of Lancelot A., who was dean of Lichfield, 1683. He was educated at Amesbury, Lichfield, and Charterhouse, where he was a fellow-pupil with Richard Steele. At the age of fifteen he went to Queen's College, Oxford; but two years later he obtained a scholarship and went to Magdalen College, where he obtained a demyship, 1689, and his M.A. degree, 1693. His facility of reciting Lat. verse first brought him into reputation, and his verses addressed, in 1694, to Dryden procured him the friendship and interest of that distinguished poet. He became acquainted with Lord Somers, and Mr. Montague, afterwards Lord Halifax, and it was through the influence of the former that he obtained, in 1699, a pension of £300 to enable him to travel on the Continent to qualify for diplomatic service. On the death of William III. he lost his pension, and returned to England late in 1703. In 1704, after living for some time in London in a state of poverty, he was appointed by the gov. to write a poem to celebrate the victory of Blenheim. This poem, entitled *The Campaign*, was so successful that he was appointed a commissioner of appeals, and held sev. appointments, 1704–10. He became under-secretary of state, 1706, accompanied Halifax to Hanover, 1707, and was appointed secretary to Lord Wharton, lord-lieutenant of Ireland, 1708. In 1709 Steele began the *Tatler*, and A. soon became

a contributor, taking a leading part in its production. The first number of the *Spectator* appeared 1711, and was continued until Dec. 1712 by A. and Steele. Then followed the *Guardian*, the first number of which was pub. in March, and the 175th and last in Oct. 1713, of which Steele was the editor, and A. a contributor. In the



JOSEPH ADDISON

same year A. brought out his celebrated tragedy of *Cato*, which procured for him still greater fame than any of his former productions had done. In June 1714 appeared the first number of a continuation of the *Spectator*, to which A. contributed until its termination in Dec. 1714. His prose comedy *The Drummer* was pub. 1715, but it was not a success. He then commenced a periodical publication in support of the gov. under the title of the *Freeholder*. It consisted of two papers a week, and was continued until June 1716. In the same year he married the Dowager Countess of Warwick. and was appointed secretary of state, 1717. He, however, retired from office, 1718, on the ground of ill-health, but really in consequence of his entire inaptitude for debate in parliament, and for the ordinary business of his office. His health soon began to fail, his domestic life was not happy, and he died at Holland House, Kensington, June 17, 1719.

As a poet and dramatist A. formerly held a much higher place than he now does; his greatness lies in the fact that he is one of the most famous of all English essayists. His style is easy, polished, and graceful, and his essays are characterised by a delicate sense of propriety, a lively fancy, and a most original and exquisite humour. He was the fo of a new school of popular wr and his works had the object of ing the manners and standard of the people, and of forming a taste and sound opinion. Alth many have attempted to imitate none have surpassed him, and contributions to the *Tatler*, *Spect* and *Guardian* are both amusing instructive, and suited alike to gay and the serious. In characte was supposed to have been somew cool; nevertheless he was kind magnanimous; and the ease and gr of his manners and conversation ma him both popular and admired.

Editions of works are: Bohn British Classics, 6 vols., 185 Tickell's, 4 vols., 1721; Baskervil ed., 4 vols., 1761; Hurd's, 6 vols 1811; Greene's, 1856; Dent's *Specta tor*, 1907. Lives in *Biographic Britannica*, *Dict. of Nat. Biog.*, John son's *Lives of the Poets*, and by Luc Aikin; Macaulay's *Essay*; Drake's *Essays Illustrative of Tatler, Guar dian, and Spectator*; Pope's and Swift's *Correspondence*, etc.

Addison's Disease, a constitutional disease characterised by degeneration of the suprarenal capsules, discoloration of the skin, and progressive anæmia and asthenia.

It was discovered by Thomas Addison of Guy's Hospital, who described it in 1855 in his book, *The Constitutional and Local Effects of Disease of the Suprarenal Capsules*.

The suprarenal capsule is a small triangular organ situated above the kidney; its function is doubtful, but it is believed to have some relation to pigment production, owing to the peculiar influence of the disease on the coloration of the skin. A substance whose active principle is adrenalin is secreted by the glands, and it is thought that the perversion or inadequacy of this substance is the cause of the disease.

The most marked symptom is the gradual bronzing of the skin, particularly where pressure is customarily brought to bear on the body, as by garters, braces, etc. The discoloration is not conclusive evidence, for it may be due to one of many other causes; but progressive asthenia, lowered blood-pressure, unaccountable vomiting and diarrhœa, and mental weakness are confirmatory symptoms. The disease usually lasts about a year, and death has occurred in the majority of cases. Some hope has been raised that the administration of the extract of the suprarenal glands may effect a cure, many cases having been notified where great improvement in general vigour has followed upon that treatment.

Addison's Walk, in Magdalen College grounds at Oxford, a walk which Addison is said to have frequented.

Addition (Lat. *addo*, to put to) is the putting together of two or more magnitudes.

In arithmetic and algebra it is the first rule denoting the putting together or adding of sev. numbers or quantities of the same kind into one number or quantity, called the sum or total. The sign of this operation is +, pronounced 'plus,' the Lat. for 'more.' Thus 2 + 3 means the number '2' added to the number '3,' and $a + b$ means the quantity 'a' added to the quantity 'b,' and represents the sum of 'a' and 'b.'

Addled Parliament, The, the nickname of James I.'s second parliament, which sat in 1614, and did not pass a single act. The king wished to obtain supplies without settling the question of imposts, but to this the members—among whom were Pym and Wentworth—would not agree, and James therefore dissolved it.

Addorsed, or Adossé, see HERALDRY.

Address, Forms of. The form of A. to and between persons has lost much of the ceremony that characterised the custom a few generations ago. Many of the methods and terms used to-day, then would have been serious breaches of etiquette, but are adopted now with a great freedom from due ceremony. The forms of A. should be as follow:—

Ambassador, British.—Address: 'His Excellency (*according to rank*), H.B.M.'s Ambassador and Plenipotentiary,' then 'Sir,' or 'My Lord,' etc., according to status. In conversation use 'Your Excellency.' Respecting the ambas.'s wife, the form 'Your Excellency,' though not correct, is often used.

Archbishop.—'His Grace the Lord Archbishop of ——, My Lord Archbishop.' Later references in the same communication, 'Your Grace.' In formal documents to the Archbishop of Canterbury the following is used: 'The Most Reverend Father in God, Randall Thomas Davidson, by Divine Providence Lord Archbishop of Canterbury, Primate of All England and Metropolitan.' To the Archbishop of York: 'The Most Reverend Father in God, Cosmo, by Divine permission Lord Archbishop of York, Primate of England and Metropolitan.' Irish archbishops appointed since 1868 are 'The Most Reverend the Archbishop of ——,' but if he is a temporal peer 'The Right Hon. and Most Rev.' is used.

Archdeacon.—'The Venerable the Archdeacon of ——, My Lord.' Afterwards 'Your Lordship.'

Baron.—'The Right Hon. Lord ——,' or 'The Lord ——, My Lord.' Refer to 'Your Lordship.'

Baron's daughter.—If unmarried, 'The Hon. (Christian name and surname).' If married, 'The Hon. Mrs. (husband's surname).' Begin 'Madam.' *If married to a baronet or* knight, 'The Hon. Lady (husband's surname).' Begin 'My Lady.' If *married to a peer, or the son of a* duke or marquess, A. accordingly.

Baron's son.—'The Hon. (Christian and surname).' Begin 'Sir.' In Scotland the eldest sons of Scottish peers are addressed, 'The Hon. the Master of (peerage title).'

Baron's son's wife.—'The Hon. Mrs. (husband's surname).' Begin 'Madam.' If the daughter of an earl, marquess, or duke, A. accordingly.

Baroness, in own right or husband's.—'The Right Hon. the Baroness ——,' 'The Right Hon. Lady ——,' or 'The Lady ——.' Begin 'My Lady.' Refer to 'Your Ladyship.'

Baronet.—'Sir (Christian name and surname), Bart.' Begin 'Sir.'

Baronet's wife.—'Lady (surname).' Begin 'Madam.' Reference 'Your Ladyship.'

Bishop, colonial.—*See* Scottish Bishop.

Bishop, English.—'The Right Rev. the Lord Bishop of London,' or 'The Lord Bishop of London.' Commence 'My Lord Bishop.' Refer to as 'Your Lordship.' A bishop is addressed in formal documents as 'The Right Rev. Father in God, Arthur, by Divine permission Lord Bishop of London.'

Bishop, Irish, consecrated before 1868.—As Eng. Bishop.

Bishop, Irish, consecrated after 1868.—'The Right Rev. the Bishop of Ossory,' or referring to the Bishops of Meath and Tuam, 'The Most Rev.' Commence 'Right Rev. Sir,' or 'Most Rev. Sir.'

Bishop, retired.—'The Right Rev. Bishop ——,' or 'The Right Rev. —— ——, D.D.' Begin 'Right Rev. Sir.'

Bishop, Scottish.—'The Right Rev. the Bishop of St. Andrews, Dunkeld, and Dunblane,' or 'The Right Rev. Bishop Wordsworth.' The Bishop Primus is usually addressed, 'The Right Rev. the Primus.'

Bishop, Suffragan.—'The Right Rev. the Bishop Suffragan of Bedford.' Commence 'Right Rev. Sir.'

Clergy.—'The Rev. (Christian name and surname). Begin 'Rev. Sir.' If the son of a duke or marquess, 'The Rev. Lord.' If the son of a viscount or baron, 'The Rev. the Hon. (Christian name and surname).' This is being used more frequently than 'The Hon. the Rev.'

Companion of an order of Knighthood.—The ordinary form is used with the addition of the initials C.B., C.M.G., C.I.E., as the case may be.

Consul, British.—' —— ——, Esq., 'H.B.M.'s Agent and Consul-General,' or 'Consul-General, or 'Consul, or 'Vice-Consul, according to rank.

Countess.—' The Right Hon. the Countess of ——. Commence 'Madam.' Refer to as 'Your Ladyship.'

Dean.—' The Very Rev. the Dean of ——.' Begin 'Very Rev. Sir.'

Doctor.—The ordinary form of A. is used with the addition of the initials D.D., M.D., LL.D., Mus.D., etc.

Dowager.—The widow of the holder of a peerage becomes a dowager on the marriage of her son. She is addressed as 'The Dowager Lady ——.' The same title can be held by more than one person, hence the term is used less frequently to-day, and an alternative form, *e.g.* 'The Right Hon. Helen, the Countess of ——,' is used, distinction being made by the use of the Christian name.

Duchess.—' Her Grace the Duchess of ——.' Begin 'My Dear Madam.' Refer to as 'Your Grace.'

Duke.—' His Grace the Duke of ——.' Commence 'My Lord Duke.' Further reference, 'Your Grace.'

Duke's daughter.—' The Right Hon. Lady (Christian name and surname),' or 'The Lady (Christian name and surname).' Commence 'Madam.' A. later as 'Your Ladyship.' If married to a peer, A. in husband's rank.

Duke's eldest son and his children.—The courtesy title is treated as if it were an actual peerage. The eldest son takes the grandfather's third title and is addressed as a peer.

Duke's eldest son's wife.—As if she were the wife of an actual peer.

Duke's younger son.—' The Right Hon. Lord (Christian name and surname).' Commence 'My Lord.' Refer later to as 'Your Lordship.'

Duke's younger son's wife.—' The Right Hon. Lady,' or the 'Lady' (husband's Christian name and surname). Commence 'Madam.' Later refer to as 'Your Ladyship.'

Earl.—' The Right Hon. the Earl of ——,' or 'The Earl of ——.' Commence 'My Lord.' Refer later to as 'Your Lordship.'

Earl's daughter.—*See* Duke's daughter.

Earl's eldest son, and eldest son's wife.—Regard the title, which is by courtesy, as an actual peerage.

Earl's younger son and his wife.—*See* Baron's son and his wife.

Governor of Colony.—' His Excellency the Governor of ——.' Rank will determine the beginning. Refer as 'Your Excellency.'

Judge, English or Irish.—' The Hon. Sir —— ——,' if a Knight, or 'The Hon. Mr. Justice ——.' Commence with 'Sir.' He is only addressed as 'Your Lordship' on the bench.

Judge of County Court.—' His Honour Judge ——.' Refer to, when on bench, as 'Your Honour.'

Judges, Scottish.—Same as Lord of Session.

Justice of Peace, in England only.—When on bench only use 'Your Worship.'

King.—' The King's Most Excellent Majesty.' Commence 'Sire,' or 'May it please Your Majesty,' or in the case of a Lord, 'Lord —— presents his duty to Your Majesty.' Reference, 'Your Majesty.'

King's Counsel.—Ordinary A. with K.C. added.

Knight Bachelor.—Same as Baronet with Bart. omitted.

Knight of the Bath, of St. Michael and St. George, or of the Star of India.—' Sir (Christian name and surname),' with the initials G.C.B., K.C.B., K.M.G., or K.S.I., according to designation. Commence 'Sir.'

Knight of the Garter, or of the Thistle, or of St. Patrick.—Ordinary Knight A. with initials K.G., K.T., or K.P. added.

Knight's wife.—*See* Baronet's wife.

Lord Advocate of Scotland.—' The Right Hon. the Lord Advocate.' Begin 'My Lord.'

Lord Chancellor.—' The Right Hon. the Lord High Chancellor.' Rank will determine beginning.

Lord Chief Justice.—' The Right Hon. the Lord Chief Justice of England.' If a peer commence according to status, otherwise, same as Judge.

Lord High Commissioner to the General Assembly.—' His Grace the Lord High Commissioner.' Commence according to peerage rank. Reference, 'Your Grace.'

Lord Justice-Clerk.—' The Right Hon. the Lord Justice-Clerk.' Commence 'My Lord,' and refer to 'Your Lordship.'

Lord Justice-General of Scotland.—' The Right Hon. the Lord Justice-General.' Begin with 'My Lord,' and refer to 'Your Lordship.'

Lord Justice of Appeal.—' The Right Hon. the Lord Justice ——,' or the 'Right Hon. Sir ——.' Begin and refer to as 'Judge.'

Lord-Lieutenant of Ireland.—If a Duke, 'His Grace.' Otherwise 'His Excellency the Lord-Lieutenant.' Begin according to rank as peer, and refer also.

Lord Mayor of London, York, or

Dublin.—'The Right Hon. the Lord Mayor of London,' or 'The Right Hon. —— ——, Lord Mayor of London.' Commence 'My Lord,' and refer to 'Your Lordship.'

Lord Mayor's wife.—'The Right Hon. the Lady Mayoress of ——.' Commence 'Madam.' Refer to 'Your Ladyship.'

Lord of Appeal in Ordinary and wife.—*See* Baron and Baroness. Children do not take any title.

Lord of Session in Scotland.—'The Hon. Lord ——.' Commence with 'My Lord,' and refer later to 'Your Lordship.' The wife has no title.

Lord Provost.—'The Right Hon. the Lord Provost of Edinburgh,' 'The Hon. the Lord Provost of Glasgow,' 'The Lord Provost of Aberdeen or of Perth.' Commence with 'My Lord Provost,' or 'My Lord.' Refer to 'Your Lordship.' Wife has no title.

Maid of Honour.—'The Hon. Miss ——.' Commence 'Madam.'

Marchioness.—'The Most Hon. the Marchioness of ——.' Commence 'Madam.' Refer to 'Your Ladyship.'

Marquess.—'The Most Hon. the Marquess of ——.' Commence 'My Lord Marquess.' Refer to 'Your Lordship.'

Marquess's daughter.—*See* Duke's daughter.

Marquess's eldest son.—*See* Duke's eldest son.

Marquess's younger son.—*See* Duke's younger son.

Mayor.—'The Right Worshipful the Mayor of ——.' Begin 'Sir.' Refer to 'Your Worship.'

Member of Parliament.—M.P. is added to the usual form of A.

Minister Resident.—'—— —— Esq., (or according to rank), H.B.M.'s Minister Resident.'

Officers in the Army and Navy.—The professional is prefixed to any other rank, *e.g.* 'Admiral the Right Hon. the Earl of ——,' 'Lieut.-Col. Sir —— ——, K.C.B.' Officers below Captain in the army or Commander in the navy are usually addressed by their civil rank with the initials of their regiment, *e.g.* R.A., R.E., added.

Premier.—According to rank.

Prince.—'His Royal Highness the Duke of ——,' if a Duke. Otherwise 'His Royal Highness Prince (Christian name).' In both cases commence 'Sir.' Refer to 'Your Royal Highness.'

Princess.—If a Duchess 'Her Royal Highness the Duchess of ——.' Otherwise 'Her Royal Highness the Princess (Christian name).' Commence 'Madam,' and refer to 'Your Royal Highness.'

Principal of a Scottish University.—If a clergyman 'The Very Rev. the Principal of ——,' or 'The Very Rev. Principal (surname).'

Privy Councillor.—'The Right Hon.,' followed by name and title. Rank will determine beginning and reference.

Queen.—'The Queen's Most Excellent Majesty.' Commence 'Madam,' or 'May it please Your Majesty.' Otherwise, 'Lord —— presents his duty to Your Majesty.' Reference 'Your Majesty.'

Secretary of State.—'His Majesty's Principal Secretary of State for the —— Department.'

Serjeant-at-Law.—'Serjeant ——' or 'Mr. Serjeant ——.'

Sheriff of London.—'The Right Worshipful.'

Vice-Chancellor.—Same as Judge. Commence 'Sir.' On bench use 'My Lord.'

Viscount.—'The Right Hon. the Lord Viscount ——.' Commence 'My Lord.' Refer to 'Your Lordship.'

Viscountess.—'The Right Hon. the Viscountess ——,' or 'The Viscountess ——.' Begin 'Madam.' Refer to 'Your Ladyship.'

Viscount's daughter, son, and son's wife.—*See* Baron's daughter, son, and son's wife.

Correspondence between equals lose much of their formality, *e.g.* 'My dear Lord.' Persons of no superior rank usually adopt 'Sir,' 'Dear Sir,' or 'My dear Sir,' according to the degree of familiarity existing between them. To a firm 'Gentlemen' or 'Sirs' is usually the form.

In the United States, the President, Governors, and all Ambassadors are addressed as 'His Excellency.' The Vice-President, heads of Executive Departments, Justices of the Superior Courts, Mayors of towns, Senators, Congress men, Consuls, and Lieutenant-Governors, and heads of state departments are addressed as 'The Hon.'

Adelaar, Curt Sivertsen (1622–75), a Dutch admiral of Norwegian birth, who assisted Venice against the Turks, and was so successful in many naval battles that Frederick III., King of Denmark, made him admiral of the Danish fleet, 1663.

Adelaide, the cap. of S. Australia, on the Torrens R., 7 m. by rail from Port A. on the Gulf of St. Vincent. It was founded in 1837, and named after the queen of William IV.; and owing to the discovery of gold soon became an important city. It is situated on a large plain, bounded on the S. and E. by the Mt. Lofty Range, and is the one Australian city planned at the outset with some coherent

regard for principles. There are no slums. Modelled on the Greek ideal, A. is commonly named 'The Athens of the South.' Admirable foresight was shown in the laying-out of the city, which is square in form and divided by the R. Torrens into two parts the north being the residential, the south the commercial centre. Bridges communicate between the two divisions, and the streets are wide and well paved. The chief business districts are Rundle and Hindley, Currie and Grenfell streets, each over a mile long, while King



ADELAIDE, NORTH TERRACE

William Street is one of the finest highways in Australia. The classic *pièce de resistance* is North Terrace, approached from the new railway station, which is planned like a Parisian boulevard with lawns and flower-beds. Here are situated the Museum, Art Gallery, Parliament House—built of S. Australian marble—Government House, the Hospital and the leading clubs. A. is rich in marble statues. A national War Memorial, of granite, very big in scale, representing the Prologue and Epilogue of War, has been erected in front of Government House, and replaces the old bronze infantryman commemorating the S. Australians who fell in the S. African War, which has been removed to another site. There is also a bronze in Creswell Garden near the Adelaide Oval, to the memory of Sir Ross Smith, M.C., the aviator. Other notable public buildings are the Anglican Cathedral of St. Peter's, the Roman Catholic Cathedral, St. Peter's Episcopal Colleges, St. Barnabas Theological College, and Prince Alfred Wesleyan College. The Botanic Gardens and Park and the Zoological Gardens are 120 acres in extent. A. is connected by rail with Sydney, Melbourne and other important towns, and is the terminus of the Overland Telegraph from Port Darwin. For the past twenty years the tramway system has been an electrical one, and the metropolitan and suburban routes now cover nearly 80 miles of track. The water-supply is good and is obtained from the catchment areas of the rivs. Onkaparinga, Torrens and Sixth Creek. A. is the emporium for S. Australia exporting through Port. A., wool, wheat, flour, and silver and copper ore. There are silver and copper-smelting works. Pop. exceeds 300,000.

Adelaide, Queen (1792–1849), the eldest daughter of George, Duke of Saxe-Meiningen; married William, Duke of Clarence, 1818 (afterwards William IV. of England). She helped to raise the standard of life at court.

Adelard, Eng. philosopher of twelfth-century and one of the greatest savants of mediæval times. His *De Eodem et Diverso* (On Identity and Differences), in which he represents philosophy and the world as being in conflict for the soul of man, estab. him as the founder of the doctrine of indifference, according to which genus and species retain their identity in the individual.

Adeler, Max (Charles Heber Clark) (1841–19[illegible] r and journalist [illegible] of the *Evening* [illegible], and ed. the *Manufacturer*. Among his works—mostly humorous—are: *Out of the Hurly-Burly*, which procured him world-wide fame in 1874; *Elbow-Room*, 1876; *Random Shots*, 1879; *An Old Fogey*, 1881; *Fortunate Island*; *Captain Bluitt*, 1901; *In Happy Hollow*; and *The Quakeress*, 1905. Though in literature the most irresponsible of jokers, he was a very serious politician—a high tariff protectionist.

Adelphi, a London purlieu in the neighbourhood of Charing Cross. See ADAM, ROBERT.

Adelsberg, a tn. in Carniola, Italy, situated to the N.E. of Trieste. It is famous for the caves in the neighbourhood. The chief, the A. Cave, about 8000 ft. long, consists of sev. grottoes with enormous stalactites. The R. Poik, or Puika, flows through the cavern, forms sev. cascades, and

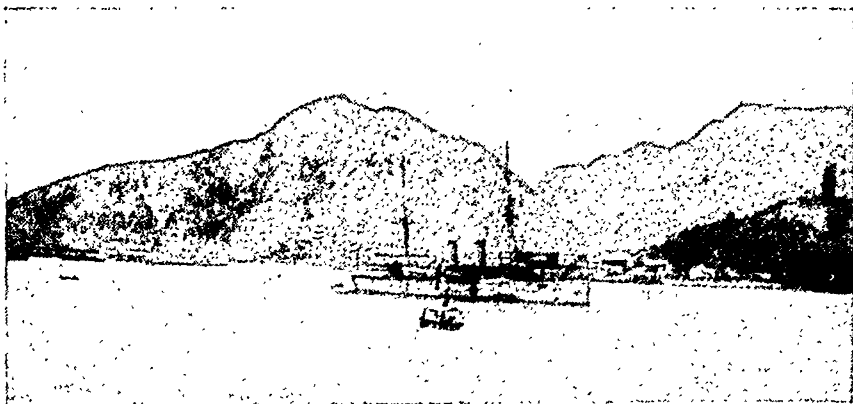
disappears through a fissure in the rock. In parts of this riv. the reptile Proteus is found. Pop. commune, 5300.

Adelung, Friedrich von (1768–1843), nephew of Johann Christoph A., was *b.* at Stettin and *d.* at St. Petersburg. He wrote works on the Sanscrit language and literature, and on the Russian language.

Adelung, Johann Christoph (1732–1806), a Ger.—celebrated linguist and grammarian—was *b.* at Spantekon, Pomerania, and *d.* at Dresden. He devoted his time to translation work, philology, and languages, and was librarian to the Electoral Library, Dresden, from 1787. His works include: *Deutsche Sprachlehre für Schulen, Umständliches Lehrgebände der Deutschen Sprache, Grammatisch-kritisches Wörterbuch der Hochdeutschen Mundart,* and *Mithridates oder allgemeine Sprachenkunde.*

Ademption means the revocation or taking away of a grant or legacy. Thus if a testator leaves a specific article in his will, and before his death the nature of the article or property bequeathed is entirely changed, or the property is destroyed, the legatee is said to suffer from A., *i.e.* he gets nothing. The word is also used in the legal sense of 'satisfaction,' *e.g.* if a testator owing money make a creditor a beneficiary under his will to the same amount as the debt, or more, then the legacy is held to have extinguished the debt.

Aden, a British possession which gives its name to the ter. and gulf of the same name, is the most populous tn. (54,900 with Perim) and important port of Arabia. It stands at the end of a rocky peninsula (which is joined to the mainland—Yemen—by a narrow sandy isthmus not 1 m. wide), and is heavily fortified. The Camp, as it is called, or A. proper, stands in the crater of an extinct volcano. Arid rocks surround it, rising at the highest point to 1776 ft., and the mean ann. temp. is 83° in the shade. The other two centres of pop. are Steamer Point and Shaikh Othman, towards the interior. A., a most prosperous tn. under mediæval Turkish rule, was at the time Britain annexed it (1839) inhabited by only 600 Arabs. The magnificent system of rain-collecting cisterns built by the Turks have been repaired by the British, and are the chief source of water-supply. By the Convention with Turkey the old boundary delimited in 1905 was extended to a point on the coast opposite Bahrein on the Persian Gulf. Administrative control is exercised through the Government of India, and the Colonial Office is responsible for political questions. The chief industries are salt and cigarette manufacture, and the total sea-borne trade is about £13,000,000 (1928). In the Great War, A. was attacked by the Turks in July 1915 (Action of Lahej), in Dec. 1916 (skirmish at Jabir) and Oct. 1918 (skirmish at Imad), but successfully defended throughout. A railway was constructed for military purposes to Lahej and has now been extended to Habil, the total length being 34 m.



ADEN

Adenitis (Gk. ἀδήν, a gland), a term used in medicine to indicate inflammation of the glands and ganglia, but especially of the lymphatic glands. It may be either acute or chronic; in the former case it generally comes from a skin wound or sore, the glands swell and are extremely painful; in the latter case the cause may be syphilis or tuberculosis, in which the

glands swell and symptoms of both diseases are generally found. The treatment for acute A. is absolute rest, and the use of antiseptic lotions; for chronic A. strengthening diet, sea air, and local applications are most beneficial.

Adenoids, or Adenoid Growths, enlargement of the lymphatic tissues at the back of the nose and throat. The condition occurs mainly in young children, and may be discovered by laboured breathing, liability to catarrh, obstruction in speech, and a characteristically stupid and apathetic expression. The growth lessens in size as the child grows older, but as it involves a grave danger in the event of any acute respiratory trouble, it is often advisable to remove it by a simple operation.

Aderno, a Sicilian tn., about 20 m. N.W. of Catania, which stands on the site of the anct. tn. of Hadranum, noted for its temple of Hadranus. It is situated on the slopes of the volcano Etna, has sev. fine churches and an anct. Norman tower and monastery built by Roger I., 1157. Pop. 31,010.

Adersbach Rocks are made of sandstone and are found in the vicinity of a vil. of the same name in Bohemia, Austria. They are 4 m. in length and of grotesque shapes. The pop. of the village is about 2000.

Adhesion, in physics, the molecular force between masses or particles of different substances, as distinct from cohesion, the force between parts of the same substance. In botany, it is also used to denote the union of dissimilar parts. In pathology, it denotes the union of two surfaces by the production of lymph after inflammation. It causes trouble after pleurisy or peritonitis and also in burns, when the fingers or toes may become united. It is beneficent when the edges of a wound are united, thus constituting 'healing by first intention.'

Adiabene, a region of Assyria E. of the Upper Tigris, conquered by Trajan. In the Christian era it was trib. to the Parthians.

Adiantum, a genus of ferns of the Polypodiaceæ, which usually inhabit damp tropical woods. *A. Capillus-Veneris,* the maidenhair fern, is found rarely in Europe. About 180 species of A. are known.

Adiaphora (Gk., indifferent things), a word signifying such actions as he Stoic philosophers held lay in he border region between good and vil. What is known as the Adiaphostic Controversy at the time of the er. Protestant Reformation arose om a dispute over certain Catholic nets. Seeking to reconcile his Catho- and Protestant subjects, the Emror Charles V. in 1548 drew up a temporary ritual and rule of fa pending the settlement of the ma by a general council. The A. w those customs and tenets declared the Leipzig Interim by Melanchth and his followers to be indifferer Luther and his supporters we bitterly opposed to this suggestion.

Adige, an important riv. rising the Rhætian Alps in Austria an flowing into the Adriatic not far N. c the Po. It is, next to the Po, th largest riv. of Italy, 120 of its 250 m being in Italian ter. It is deep, and below Verona has a width of about 500 ft., but its rapid current makes navigation difficult. Many important battles have been fought on its banks.

Adigherat, or Adigrat, a small tn. of Tigré, Abyssinia, which has an important market, and near which is Mt. Aleghia.

Adi Granth, the sacred book of the Sikhs, was ed. by Arjun Mal (the fourth 'guru' or chief-priest from the founder of the sect) about the end of the sixteenth century.

Adipic (Lat. *adeps,* thick) **Acid,** a crystallised solid acid, obtained by the oxidation of certain fatty or waxy bodies. It is a dibasic acid, akin to oxalic and succinic acids.

Adipocere, a wax-like substance produced by the exposure of fleshy tissue to moisture with the exclusion of air, as in the earth or under water. Human bodies in moist burial-places often undergo this change.

Adipose Tissue, a collection of fat within the body of an animal. It consists of minute cells containing a secretion of oily matter. A. substance is what is known as a connective tissue, that is, it constitutes a sort of packing material between the harder tissues which form the framework of the body. Its uses are to protect the organs from external changes of temp., and to constitute a reservoir of material which may serve as food when other supplies fail. An excessive amount of A. T. is developed in the course of some diseases.

Adirondack Mts., a very beautiful group in the N. of New York State, U.S.A. They may be regarded as the continuation of the Alleghanies, and they terminate abruptly on the shore of Lake Champlain by sheer cliffs. They stand on a plateau 2000 ft. above sea level, cover an area of 5000 sq. m., and their highest peak, Mt. Marcy, or Tawahus, has an alt. of 5345 ft. The dist. abounds in lakes and waterfalls, and here are the head-streams of the Hudson. A forest reserve of 4375 sq. m. is owned by the state. A certain amount of lumbering is carried on, but the region is principally noted for being a favourite summer resort.

Adit, a horizontal entrance to a

mine, sometimes called a drift. *See* MINING.

Adjective (Lat. *adjectivum*, from *adjectivus*, that is, added) is the name of one of the parts of speech used with a noun, or substantive, to express a quality of the thing named; something attributed to it; to limit or define it, or to specify or describe a thing, as distinct from something else. Thus in the phrase 'a good man,' 'good' is the A., and expresses the quality of the man.

Adjective Law, rules of law that concern procedure as against Substantive Law (*q.v.*).

Adjudication, An order of, in the Eng. law and a decree of sequestration in Scots law, is the order of a court adjudging a debtor a bankrupt and appointing a trustee to administer his estate. In Scots law A. means a process to attach the heritable property of a debtor—not necessarily a bankrupt. *See* BANKRUPTCY.

Adjustment of Average, a term used in marine and fire insurance, but mainly in the former, to denote the settling of the amount to be paid by the underwriters to the insured person and each underwriter's share of the loss. *See* INSURANCE.

Adjutage, or **Ajutage**, a tube attached to an orifice through which water is discharged. *See* HYDRAULICS.

Adjutant, an army officer, not above the rank of major, often a captain, and sometimes a subaltern, who assists the officer commanding a battalion or regiment, particularly in the carrying out of the detail work. His duties are multifarious and include that of aide-de-camp in the field. He has charge of the correspondence and official records, he keeps the accounts. The officers' duty roster is prepared by him, he issues by the authority of the commanding officer the daily orders, and generally is responsible for the discipline and efficiency of the corps. He supervises the drilling of recruits, and acts as prosecutor in all courts-martial that concern his men. The appointment is held for about four years; in the auxiliary forces for five years. The *A.-General*, who is the second military member of the Army Council, has somewhat similar duties toward the army as a whole as has the A. to his corps, *i.e.* he is entrusted with all matters pertaining to discipline and efficiency of the troops.

Adjutant (*Leptopilus argala*), a bird of the stork family found in various parts of India, but more especially in the N. and near water. It resembles somewhat the marabou stork of Africa, but is larger, and when erect it stands about 5 ft. high and measures from tip to tip of its extended wings about 15 ft. With its almost bald head and neck and its pouch (sometimes 16 in. in length), which hangs like a dewlap from the



ADJUTANT

lower part of its neck, the bird presents an uncouth appearance. It has a voracious appetite, no carrion nor offal or putrescent matter apparently being distasteful to it.

Adler, Felix (*b.* 1851), American educationist, *b.* at Alzey, Germany, the son of a Jewish rabbi, who in 1857 emigrated to the U.S. He graduated at Columbia Coll. in 1870, completing his studies at Heidelberg. Became prof. of Heb. and Oriental literature at Cornell Univ. in 1874. Estab. the Soc. for Ethic. Culture in New York in 1876. In 1902 became prof. of political and social ethics at Columbia Univ. Publications: *Creed and Deed* (1877), *Life and Destiny* (1903), *Marriage and Divorce* (1905), and *The Religion of Duty* (1905).

Adler, Friedrich (1827–1908), a Ger. architect and archæologist, *b.* in Berlin. Among his chief designs are those of the churches of Christ and St. Thomas in Berlin.

Adler, Georg (1863–1908), Ger. economist, *b.* at Posen in Ger. Poland. First appointed a lecturer on national economy at Freiburg, 1886, and subsequently became professor at Bâle and Kiel. He made a special study of Socialism, to which many of his books relate.

Adler, Herman (1839–1911), son of Nathan Marcus Adler (*q.v.*), and succeeded his father on his death, 1891, in the chief-rabbinate of the Jews of the British Empire; *b.* in Hanover, graduated B.A. London, 1859, became prin. of Jews' College, 1863, and in 1879 became coadjutor to his father as delegate chief-rabbi. He broke a lance in defence of Judaism with Professors Goldwin [illegible] controversial works he pub. (1864) *Ibn Gabirol, the Poet-Philosopher*.

Adler, Nathan Marcus (1803–90), chief-rabbi of the Jews of the British Empire, *b.* at Hanover, educated at Göttingen, Erlangen, and Würzburg. He was [illegible] urg, 1829, at [illegible] appointed [illegible] in London, 1844, in which capacity he did much to reunite the various Jewish congregations. Pub. sermons and other works, including one on the Pentateuch.

Ad libitum (or *ad lib.*, at discretion, at pleasure), in music, denotes that the part so marked need not necessarily be played strictly to time, but that the performer may pause, or introduce any cadence or addition of his own. An accompaniment is said to be 'A. L.' when it is not essential, and may be either played or omitted.

Administration. Of the two functions of gov., legislation and A., the latter is by far the larger and more important, and in recognition of this fact the gov. of a country is often termed the A. or ministry. In modern constitutional states this A. must be in accordance with the law, [illegible] ddition to be- [illegible] gislature, the [illegible] as ordinary persons for maladministration.

Administrator, a person appointed by authority to dispose of or administrate the estate of an intestate deceased, or of a deceased who has made a will but named no executor, or if an executor dies before the distribution of the property. Such a person is now appointed by the Probate Division of the High Court, but prior to the creation of this court in 1858 an A. was appointed by the bishop of the diocese. Letters of administration are generally granted by the court to the next of kin, or in default a creditor may obtain them. An A. can charge upon the estate he administers his actual expenses but no more, and he is usually required to give some guarantee for faithful and competent administration. Letters of administration must be applied for within six months of the death of the deceased, and a person performing the functions without this licence may be mulcted in £100 fine, plus an additional fine equal to 10 per cent. of the value of the estate. The essential difference between an executor and an A. is that the latter can do nothing without the assent of the court appointing him.

Admiral, the title of the chief naval officers and the equivalent in rank in the marine forces to a general on land; in fact, the four classes of As. (As. of the Fleet, A., vice-As., and rear-As.) are equal in precedence with the four divs. of generals (field-marshal, general, lieutenant-general, and major-general). The word is derived from the Arabic *amir* or *emir*, meaning a 'lord' or 'commander' (*cf. amir-al-bahr*, commander of the sea), and found its way into European tongues, like many others of Eastern origin, during the holy wars of the twelfth and thirteenth centuries. The office is, however, considerably older, and before the word became used in this country under Edward III., the chief naval officer was known as the 'guardian of the sea' (*custos maris*). The early Eng. form of the word was *amiral* or *ammiral*, the latter form being used by Milton, Cromwell's secretary of state. The present spelling of the word probably arose from the belief that it was an abridged [illegible] or that it was a [illegible] Lat. *ad*. The [illegible] A., which subsisted with breaks from 1405, when it was created by Henry IV., till 1828, when [illegible] tions were ve[illegible] of Admiralty [illegible] ance and carried with it certain judicial functions, which, since 1875, have been exercised by the Probate, Divorce, and Admiralty Division of the High Court (*q.v.*). The first Lord High A. was th[illegible] and from his ti[illegible] were exercised b[illegible] 1632, when for t[illegible] was put into [illegible] great officers of state being commissioners. During the Commonwealth naval affairs were at first directed by a parl. committee, but afterwards Cromwell himself took control of them. When Charles II. was restored he appointed his brother James to be Lord High A., which office he retained till 1683, when Charles himself assumed it. On James' accession to the throne the next year he resumed his former office, but at the revolution of 1688 the office was again put into commission, in which position it has remained till this day if we except the three years 1707–9, and the sixteen months (1827–8) when

the 'sailor-prince,' afterwards William IV., was Lord High A. Eng. As. are divided into the classes above mentioned. Formerly the As. of all grades were subdivided into As. of the Red, of the White, and of the Blue Fleet, but this is now abolished, as is also, owing to the entire structural alteration in the form of war-vessels, the old practice of an A. flying his ensign at the main, the vice-A. at the fore, and the rear-A. at the mizzen masthead. There are at present about 100 As. on active service. In the U.S.A. there are, at present, two grades—A. and rear-A.—established respectively in 1866 and 1862. The grade of vice-A. was established in 1864, but was allowed to lapse in 1890. Captain Farragut (*q.v.*) was the first to hold each of these ranks, which indeed were created in turn by Congress in his honour. The grade of A. was allowed to lapse on the death of Farragut's successor in 1891, but was re-established in 1899 in favour of Commodore Dewey (*q.v.*). Officials of the Navy Department hold, during the term of their office, the rank of rear-A.

Admiralty, the name given to the gov. dept. administering the British navy. Formerly responsibility for maritime affairs was entrusted to the Lord High Admiral, one of the great officers of state; but to-day his functions are discharged by 'Commissioners for executing the office of Lord High Admiral,' commonly called the Lords Commissioners of the Admiralty. The growth in importance of the A. as a military arm has been accompanied by a shedding of others of its functions and some of its privileges. Thus its judicial function, except in matters of naval discipline, has been transferred to other courts, notably the Probate, Divorce, and A. Court (*q.v.*), while the A. Droits (*q.v.*) are now collected by the Board of Trade and their proceeds paid into the public exchequer. The office of Admiral of England, with its variant terms Lord Admiral, High Admiral and Lord High Admiral, dates certainly from 1360, but its origins are earlier. The office was first placed in commission in 1628 upon the assassination of the Duke of Buckingham. The executive authority remained with the political Lords Comissioners, but the administrative work was transacted by a subordinate board of technical officials called the Navy Board, consisting of the principal officers of the Navy. The Navy Board had been constituted by Henry VIII. in 1546 from existing officials whose origin developed out of the office of Keeper of the King's Ships, first created by King John on the appointment of William of Wrotham, Archdeacon of Taunton, in 1214. Samuel Pepys was one of the Principal Officers of the Navy from 1660 to 1673, holding the office of Clerk of the Acts, and wrote his famous diary in the old Navy Office.

The Admiralty, sometimes in commission, and at times held even by the King himself, had no permanent quarters till the reign of William III., when Wallingford House, the old residence of the Duke of Buckingham in Whitehall, was rebuilt and occupied in 1695. The office was again rebuilt 1723–5, from designs by Thomas Ripley; and the screen erected in 1760 from designs by Robert Adam. The old Board Room contains some fine carving, and several historic items. With the expansion of business, a separate residence was erected, 1786–91, for the First Lord adjoining the Admiralty office. Reorganisation in 1832 abolished the Navy Board, which since 1786 had occupied Somerset House; and in 1869–73 the staff there was transferred to Spring Gardens till an extension of the Admiralty buildings should be built. The new building (erected 1891–1906) was extended in 1910 by the erection of the Memorial Arch across the Mall, which commemorates Queen Victoria. In the archway block is the residence of the First Sea Lord. On the new buildings is erected the Admiralty wireless station, by means of which direct communication with war vessels is maintained with headquarters. The last Lord High Admiral, 1827–8, was the Duke of Clarence, who afterwards became William IV. The members of the Board of A. are denominated Lords Commissioners. Formerly the whole Board changed with the gov., but normally only the political members change nowadays. The Board is appointed by royal letters patent, and any change necessitates the issue of a fresh patent. The number of commissioners has varied with the amount of business, having reached twelve in 1918. To-day (1930) there are eight, their titles and present duties are as follows: 1st, FIRST LORD OF THE A., who is a member of the cabinet and a privy Councillor, and resigns when the gov. does; he presides over the deliberations of the Board and has the general direction and supervision of all business relating to the navy, controls all appointments to the higher posts and at Board meetings he has the casting vote. 2nd, FIRST SEA LORD AND CHIEF OF NAVAL STAFF, is an officer of the R.N. and deals with questions of naval policy and maritime warfare, is responsible for efficiency of

the Fleet and controls the work of the naval staff. 3rd, SECOND SEA LORD AND CHIEF OF NAVAL PERSONNEL, is an officer of the R.N. and is responsible for the manning of the Fleet, mobilisation and medical arrangements and discipline. 4th, THIRD SEA LORD AND CONTROLLER, is an officer of the R.N. and is responsible for the provision of all kinds of material, including ships, machinery, guns, ordnance and stores, controls design, manufacture and maintenance, inventions and research. 5th, FOURTH SEA LORD AND CHIEF OF SUPPLIES AND TRANSPORT, is an officer of the R.N. and is reponsible for coaling, victualling, transport, pay and allowances, clothing and medals; 6th, DEPUTY CHIEF OF NAVAL STAFF, is an officer of the R.N. and is responsible for the collection of intelligence, co-operation with aircraft, land and wireless telegraphy: deals with questions of Maritime International Law. 7th, PARLIAMENTARY AND FINANCIAL SECRETARY (political; first included in the patent in 1929), is a M.P. and resigns his appointment when the gov. does; is in charge of all questions concerning Finance, Expenditure, Estimates, Accounts and Contracts. 8th, CIVIL LORD (also political), is a M.P. and resigns when the gov. does; he superintends all Works Services, general labour questions and schools. If the Civil Lord is a member of the House of Lords he deals with all A. questions in that House. The PERMANENT SECRETARY of the A. is not a Lord Commissioner of the A. He is a member of the Civil Service, is in charge of the secretariat, has financial control of the A., is accounting officer for Navy Votes, and is responsible for A. procedure, organisation and discipline of the civil branches of the A. (Samuel Pepys, as stated above, held a similar post in the old Navy Office in 1660). The Coast-guard service, which was formerly under the Admiral-superintendent of naval services—called in more modern days 'Admiral Commanding Coast Guard and Reserves'—came to the A. in 1858 and, in 1923, was transferred to the Board of Trade. The older part of the A. contains some fine mahogany panelling and marine paintings by eminent artists. For details of U.S.A. see *Navy Department*.

Admiralty Court. The function of this court, formerly exercised by the Lord High Admiral, or by a judge holding a patent from him, is to try and to give judgment in maritime cases. Since the Judicature Acts of 1873 and 1875, which estab. the Probate, Divorce, and A. Division of the High Court, these functions have been discharged by two judges, who, in addition to giving judgment in probate and divorce matters, exercise the jurisdiction of the old A. C. Its duties are twofold, as an instance court and as a prize court, functions which in former days were discharged by two separate courts, albeit the judge of the instance court was usually appointed to preside over the prize court. In its capacity as a prize court the court has jurisdiction in matters of capture in port or on land if the capture has been effected by a naval force, or a mixed naval and military force. The court can also try any questions referred to it by the privy council concerning booty of war, *i.e.* property captured by land forces. As an instance court it originally dealt with both criminal and civil causes, but a series of statutes transferring the criminal side of its work to other courts has rendered this branch of its jurisdiction practically obsolete. When the Central Criminal Court was estab. in 1836, A. criminal causes were transferred to it, and the A. Offences Act, 1844, provided that in cases where A. jurisdiction would have applied, they should be treated as if they were offences committed in the country where the offender was apprehended. The Naval Discipline Act, 1866, transferred to naval courts-martial the authority hitherto possessed by the A. C. in the matter of discipline in the navy. In civil cases again part of the work of the A. C. has been entrusted to the county courts. The more important questions that the A. C. has to decide comprise those arising from disputes between part-owners of vessels, suits by seamen for wages, where not within the jurisdiction of other courts, cases of salvage, including A. Droits (*q.v.*), and actions for damages arising out of collision of ships, etc. There is a separate A. C. for Ireland, but matters of prize are vested in the Eng. court. The court of A. for Scotland was abolished in 1831, and its jurisdiction transferred to the ordinary courts — session, justiciary, and sheriffs — and the maritime law of Scotland is the same as that of England. Courts of vice-A. exist in many British colonies. Appeals from the A. C. lie to the House of Lords, and from vice-A. Cs. to the judicial committee of the privy council.

U.S.A.—By the U.S. constitution, as interpreted by the U.S. Supreme Court, A. jurisdiction extends not only to the high seas but to the great lakes and rivers connecting them and to all public navigable waters in the U.S. The States long ago delegated the jurisdiction of their old vice-

A. Cs. to the federal government. This jurisdiction comprises all maritime contracts, torts, injuries, or offences. The Supreme Court has no original jurisdiction in A., all suits being in the first instance brought in the U.S. district courts. An appeal both on law and fact lies from the latter courts to the Circuit Court of Appeals, and this appeal is final except in cases touching the jurisdiction of the court, the construction of a treaty, cases of prize, the constitutionality of a state or federal law, and cases of infamous crime, when the right of appeal is direct to the Supreme Court. The A. Cs. have jurisdiction also in cases of piracy and collision and over crimes and offences committed upon the sea within the administration and maritime jurisdiction of the U.S.

Admiralty, Droits of. These are certain perquisites that formerly appertained to the Lord High Admiral, chief among them being the right to property of an enemy seized at the beginning of a war, and derelict ships at sea. In the case of the latter the finders of the abandoned vessel were entitled to nine-tenths of its value, the A. D. being the remainder.

Admiralty Island, a large island off Alaska, about 80 m. long, well wooded; discovered by Admiral George Vancouver about 1793.

Admiralty Islands, in the Pacific Ocean, form part of the Bismarck Archipelago. The largest is about 50 m. long. Discovered by the Dutch in 1616, they came under German protection in 1885.

Adobe, a Spanish term for sun-dried bricks made from any substance which hardens in the sun; also used of the buildings made with the bricks. They are manufactured largely in Peru, and also in Egypt, Asia, and N. America.

Adolphus, John (1768–1845), an Eng. lawyer and writer of Ger. extraction. His chief success as a lawyer was in his defence of Thistlewood, the Cato Street conspirator, in 1820. He pub. a *History of England from the Accession of George III. to the Conclusion of Peace in 1783* (1802), also a *History of France from the year 1790 to the Peace at Amiens in 1802* (1803). See *Recollections of the late J. Adolphus*, by his daughter, Emily Henderson, 1871.

Adolphus, John Leycester (1795–1862), lawyer and writer, son of John Adolphus (*q.v.*), called to the bar in 1822, and judge of Marylebone County Court, 1852. His *Letters to Richard Heber, Esq.*, pub. anonymously in 1821, demonstrated that Sir Walter Scott was the author of the Waverley Novels; the *Letters from Spain in 1856 and 1857* appeared in 1858. At the time of his death he was engaged in the completion of his father's *History of England*. *See* J. G. Lockhart's *Life of Sir Walter Scott*, 1837.

Adonai, a Heb. word for the 'Supreme Being.' The singular form is 'Adon,' meaning 'lord,' and the final 'i' is the possessive 'my.' The Jews pronounced 'JHVH' Adonai, and from the consonants 'Jhvh' and the vowels of 'Adonai' the name 'Jehovah' has arisen.

Adoni, a tn. in the Bellary dist., Madras, formerly a stronghold of the Vijayanagar kings. It manufs. cotton very largely, especially cotton carpets. Pop. 30,232.

Adonis, a mythological Gk. hunter, son of Cinyras and Myrrha, beloved of Aphrodite. He was slain by a boar, and descended to the lower world; Aphrodite sprinkled nectar on his blood and from it sprang the *anemone*. Persephone refused to give him up to Aphrodite, and Zeus settled the dispute by allowing him to spend one-third of the year with each goddess in turn, and one-third belonged to himself. He is represented as the type of masculine beauty, and as such appears in poetry. *See* Ovid's *Metamorphoses*, x. 298–739; also Shakespeare's *Venus and Adonis*.

Adonis, in botany, is a genus of plants belonging to the Ranunculaceæ, found in Europe and N. America. The *A. vernalis* is a spring flower of a brilliant yellow; *A. autumnalis*, or pheasant's-eye, is found in wheat-fields in the autumn; *Flos A.* has scarlet petals fancifully connected with the blood of the mythological hero.

Adoptianism, an heretical doctrine which originated in Spain at the end of the eighth century. Elipandus, archbishop of Toledo, and Felix, bishop of Urgel, declared that Christ in His divine nature was the Son of God by nature and generation, in His human nature He was the Son of God by adoption and grace. Charlemagne condemned the two bishops at the Synods of Ratisbon in 792 and Frankfort in 794; Felix recanted, but Elipandus adhered to his views. *See* A. Harnock's *Grundriss der Dogmengeschichte*, 1889; R. L. Ottley's *Doctrine of the Incarnation*, 1896; C. W. F. Walch's *Historia Adoptianorum*, 1755.

Adoption. Although A. knows no place in the Eng. or Scotch systems of law, it is a custom widely prevalent and legally regularised in many countries both ancient and modern. Broadly speaking, the term is used for the act of taking a person into a family with the intention of conferring on that person the rights and duties of his new family. In the

United Kingdom, A. is sometimes practised by the benevolent and childless, but, as above said, no legal liability is incurred by the adoptive parent. The theory of A. is generally traced to two motives: first, the desire to increase the strength of the family or clan, and, second, to ensure, as in anct. Athens and modern India, the performance of sacred funeral rites. It follows naturally that where parental rights are strong, A. assumes its greatest importance, and in ancient Rome, where the relationship of father and son was akin to that of master and slave, the law of A. played an important part. As an indication of this importance it may be recalled that the first of the emperors, Augustus, was the adopted son—though naturally the nephew—of C. Julius Cæsar, and that all the Antonine emperors were adopted. There were two forms of A. in Rome: one, by a fictitious or formal sale of the child by his natural parent before a magistrate, and, two, by abrogation, *i.e.* by a vote of the people in the *Comitia Curiata*, or, at a later period, by imperial rescript. In the case of abrogation it was necessary for the person adopted to be *sui juris* (his own master). A woman, having no parental power (*patria potestas*) over her own children, could not adopt a child. Considerable changes were introduced in the *Institutes* of Justinian, chief among them being that parental authority did not pass to the adoptive father.

Adour, called by Roman writers Atur, Aturis, and Aturus, is a riv. of France which rises in the Pyrenees, and, after a course of 200 m. flows into the Bay of Biscay. On its banks are Bagnères-de-Bigorre, Tarbes, Aire, St. Sever, Dax, and Bayonne, and some of its affluents are the Gabas, Luy de France, Luy de Béarn, Gave de Pau, and the Bidouze on the left; the Midouze on the right.

Adowa or Adua, the cap. of Tigré, Abyssinia, is a well-built tn. with a pleasant climate. The Abyssinians here severely defeated the Italians on March 1, 1896. Pop. 5000.

Adoxaceæ (Gk. ἀ, without, δόξα, lory), an order of the Dicotyledons, which the moschatel is the single pecimen. It is related to the Capriliaceæ and Saxifragaceæ.

Adoxa Moschatellina, the moschatel, is a spring flower with a smell e that of musk. It is found in nperate climates, notably near mpstead, London.

Adra, a tn. of Andalusia, Spain, r which is anct. Abdera, founded the Phœnicians. The chief occuon is lead-mining. Pop. 11,246.

drar (Berber for 'highlands'), an oasis of the Sahara, with Wadan cap. Its products are dates, gra melons, and salt. Pop. 7000.

Adrastus, King of Argos, a legenary Gk. hero, waged war on behalf Polynices, his expedition being know as the *Seven against Thebes*. A. alo escaped alive. The Epigoni, or descendants, later destroyed Thebe and the son of A. alone fell. A. die of grief for the death of his son. Se Herodotus, i. 41–45; 67–68.

Adrenalin ($C_9H_{13}O_3N$), a compound prepared from the suprarenal capsules of the horse and other animals. It is used in medicine to arrest hæmorrhage, and in the treatment of Addison's disease.

Adria (anct. Hadria, Hatria, or Atria), once a seaport of the Adriatic, is now 14 m. inland in Rovigo, Italy, near the Po and the Adige. The remains of the old city are buried near the present one. It is a bishop's see. The exports are cattle, grain, silk, flax, leather, and pottery. Pop. 17,584.

Adrian, *see* HADRIAN.

Adrian, the name of six popes.

Adrian I. was pope from 772 to 795. He received aid from Charlemagne during an invasion of his realms by the Lombards. Some dispute arose concerning image-worship without, however, disturbing the friendliness of the Frankish alliance. He *d.* before the dispute was settled.

Adrian II., pope from 867 to 872. During his occupation of the papal chair trouble arose over the subject of his power over Bulgarian converts. He was compelled to submit.

Adrian III., who was pope from 884 to 885, was succeeded by

Adrian IV., the only Englishman to enjoy papal control. His name was Nicholas Breakspear, and he was *b.* about 1100 at Langley in Hertfordshire. His father was a priest of Bath, who abandoned his son, entering a monastery. Nicholas went to Paris and became a monk at St. Rufus near Arles. In 1137 he was elected abbot. He was summoned to appear before the pope at Rome as a result of a conspiracy to overthrow him, because of a strongly developed disciplinarian attitude towards his monks. At the inquiry he distinguished himself by his successful defence, and moreover won approval from the pope. In 1146 he was appointed cardinal-bishop, and in 1154 was elevated to the papal chair. He *d.* in 1159, after causing a long contest between the popes and the house of Hohenstaufen, which dynasty was finally overthrown long after A.'s death.

Adrian V. became pope in 1276 and *d.* in the same year.

Adrian VI. was pope from 1522 to 1523. His administration was actuated by a desire to sweep away all existing abuses, but met with much opposition.

Adrian, a tn. in Michigan, U.S.A., 211 m. E. of Chicago with a college and an industrial home, railway shops and manufactures. Pop. 11,878.

Adrian de Castello (*c.* 1460–*c.* 1521), Italian scholar, statesman, and ecclesiastic, was *b.* of humble parents in Tuscany. As servant of Pope Innocent VIII. he was sent to England in 1488, and became Henry VII.'s agent at Rome. In 1502 he was appointed bishop of Hereford, in 1503 Pope Alexander VI. created him cardinal, and in 1504 he became bishop of Bath and Wells. In 1517 he was accused of being accessory to the plot to poison Pope Leo X. and stripped of all his offices in 1518, Cardinal Wolsey being his successor at Bath. He fled to Venice, and is thought to have been murdered on his return journey to Rome when Leo X died. His writings consist of a poem entitled *Venatio*, 1505, and two treatises.

Adrian's Wall, *see* ROMAN REMAINS.

Adrianople (Gk., city of Hadrian), the Turkish Edreneh, is in European Turkey, at the confluence of the Tunja and Maritza (anct. Hebrus). The Rom. emperor Hadrian embellished it and gave it his name; from 1361 to 1453 it was the residence of the Turkish sultans. It was occupied by Russians (under General Diebitsch) in 1829, and again in 1878. The mosque of Sultan Selim II. is a magnificent building, while the mosque of Sultan Mourad I. and the bazaar of Ali Pacha are worthy of note. Its manufactories are of silk, wool, cotton, perfumes, and it contains dye-works and tanneries. During the Balkan war it was besieged and taken by the Bulgarians and Servians, but in spite of the Treaty of London, it remained in the hands of the Turks. By a secret Treaty between the Central Empires and Bulgari[illegible] the price of her entr[illegible] War on the side of [illegible]s promised, at the [illegible], a strip of land along the Maritza, controlling both that riv. and A. Restored to Turkey after the Great War. Pop. 150,000.

Adriatic Question, The. The question of the control of the Dalmatian coast of the Adriatic, apart from the necessity for securing her northern frontier, was that which primarily determined Italy's policy towards the belligerents in the Great War. The whole future development of the country was involved in the solution of the problem of Italia Irridenta, and Italy's participation in the conflict was to be obtained only on consideration that an appreciable guarantee was afforded of redeeming peoples traditionally regarded as Italian in sympathy and blood. In 1915 Italy signed with Great Britain and France the Secret Pact of London, by which it was agreed to give to Italy Trieste, Pola, and part of Dalmatia. The negotiations were necessarily of a delicate nature, for opposition was to be expected from the Slavs and, through them, Russia. It is not surprising in all the circumstances that the price demanded by Italy for her active intervention on the side of the Entente met with a formal protest from the Serbs against any such concession being made. The Adriatic littoral is almost exclusively populated by the Croats and Serbs, and the fact that the principle of the liberation and unification of the nations—one of the predominant factors in the European crisis of 1914—and in particular the Slav nation, would be violated by any such arrangement, was of itself enough to enlist against Italy the sympathies of the Russian government. It was openly stated in the Russian Press that Russia's mission in the Balkans would be rendered nugatory, that any just solution of the Macedonian question would be made more difficult and that Italy would inherit from Austria a legacy of 'constant friction with Serbia.' It is true that in some quarters in Russia the view was expressed that Serbia should give way to Italy's well-known persistency in bargaining in order to bring an end to the bloodshed in Europe, the more especially as the Serbians had already opposed difficulties to the common aims of the allies in S.E. Europe by their uncompromising attitude towards the Macedonian problem. It was said by these advocates of compromise that the avoidance by Serbia of a non-possumus attitude would possibly have led to Bulgaria entering the war on the side of the Entente. It may be assumed that the prevailing opinion in Russia, while against the cession of the Dalmatian coast, was still more averse from any action which would result in a new Macedonian problem. It was rightly pointed out in Russian political circles that the immediate origin of the Macedonian problem was the Treaty of Bucharest (1913), which destroyed the Balkan Alliance and in a sense led indirectly to the Great War. A similar state of things was being created by the conclusion of the Italian agreement, but that of itself did not avoid the necessity for undoing the mischief caused by the

Treaty of Bucharest, and Italy's wrongdoing must be left to reap its own fruits at a future date. This view of the whole situation, based as it was on the principle of nationality, was a sound one, as the secession of Signor Orlando from the Council of Four in 1919 proved. In the result the Croatian and Slav claims were ignored and the alliance of Italy was purchased at the price asked by that power.

(*See also* FIUME; LONDON, PACT OF; TRIPLE ALLIANCE.)

The Adriatic Considered Strategically. An examination of the strategic position in the Adriatic as in the early months of 1916 will readily show why Italy failed to save Montenegro, and it will likewise explain why Italy deemed it prudent to occupy Valona in the very early stages of the war and long before the German armies entered the Balkans. Italy's eastern shore possesses no harbours suitable as naval bases for a modern squadron (except Taranto, which is outside the Adriatic). The opposite coast contains many of the finest natural harbours in the world, like Pola, Sebenico, Cattaro, Durazzo, Trieste —flanked for the most part with an amphitheatre of hills, capacious enough to accommodate a large fleet, and the whole Dalmatian coast is thickly studded with sheltering islands. Cettinje was therefore doomed almost from the commencement, for it lies at no appreciable distance from Cattaro. Durazzo, though seized by the Italians, had to be given up as Austrian power spread southward. For the past forty years and more Italy's position in the Adriatic has always been precarious from a strategic standpoint; and this danger became accentuated when Austria took possession of Bosnia and Herzegovina. It was therefore hardly from imperialistic motives that the Italians have coveted Adriatic control, or a greater measure of control. The intolerable character of the position had given rise to one of the fundamental doctrines of modern Italian statesmanship, and leading Italian politicians have consistently held that until the equilibrium of the Adriatic—which in old Italian documents is significantly spoken of as *Il Golfo di Venizia* and by masses of Italian people to-day as *il Mare nostro*— should be restored, Italy would never be in a position of adequate security (in fact from the point of view of national independence. This doctrine unquestionably influenced Italian statesmen at the time of Italy's intervention in the War, and throughout it lent to Italian action much of its initiative, enthusiasm, and driving force.

Adriatic Sea, or Gulf of Venice, is a large arm of the Mediterranean into which the Po and Adige empty themselves. It is about 500 m. long, and its average breadth is 100 m.; the water is very salt. In summer navigation is safe, but the S.E. winds make sailing dangerous in winter. It probably derives its name from the anct. city of Adria. *See* C. Yriarte's *Les bords de l'Adriatique et le Monténégro,* 1878; G. L. Faber's *The Fisheries of the Adriatic and the Fish thereof,* 1883.

Adule, the anct. name of Zulla or Thulla, on the coast of Abyssinia, near Annesley Bay. It is interesting as the locality in which Cosmas, a Christian merchant, discovered the Gk. inscription known as the *Monumentum Adulitanum*—really two inscriptions united, one referring to Ptolemy Euergetes (247–222 B.C.), the other to an unknown Ethiopian king. It also describes the subjugation of the Abyssinians. *See* H. F. Clinton's *Fasti Hellenici,* part ii., 1824.

Adullamites, a political term applied to the Liberals who voted against Gladstone's Reform Bill of 1866. Bright compared the seceders with the fugitives who hid with David in the Cave of Adullam (1 Sam. xxii.); Lord Elcho spoke of Gladstone as *Saul,* and Bright as the *armour-bearer.* The *Cave* is another name of the group.

Adult Education. The Board of Education, in April 1921, appointed a Committee to promote the development of liberal education for adults, and, in particular, to bring together national organisations concerned in A. E., so as to secure mutual help and prevent overlapping. The Committee was also invited to advise the Board on any matters referred to it by the Board. It is, however, only since the issue of the A. E. Regulations in 1924 that any marked change has taken place. In the ensuing six years the more elementary and pioneer forms of A.E. came into prominence, with such names as Preparatory Classes, One-year Courses, and Terminal Courses (all these being under the Board of Education A.E. Regulations), and evening classes for adults, study circles, and a multitude of other titles (these, not being organised so as to conform with the Regulations, having a free choice of title). The growth of this type of work creates, in a sense, a new position in A.E.; it is a source of great satisfaction to those whose chief desire is the spread of education, but a source of some anxiety to those who see in it a danger of confusion of

aims between different kinds of A.E. and of a decline in standard.

The position at the outbreak of the Great War was that the term 'adult education' was commonly used to denote the activities of the University Extension movement and the Workers' Educational Association; and that many other bodies and institutions which, in furtherance of religious or social aims, had, for many years past, undertaken educational work among adults, were examining the methods adopted by the Workers' Educational Association in conjunction with the Universities, and were co-operating in certain areas with the Association in the formation of classes. But the movement was still in an early stage of development, and the term 'adult education' was not familiar to the man in the street, nor did it bulk large at educational conferences. There were, in fact, 110 University Tutorial Classes and 82 classes which would not be called One-year Courses in receipt of grant-aid from the Board of Education in the year 1913–14. It was scarcely expected at that time that A.E. would, within a few years, become a familiar term, and assume such importance that the benevolent intentions of all political parties towards it would form part of their election pledges.

In the session 1919–20, University Tutorial Classes in England and Wales numbered 226, or twice the number in 1913–14; in the session 1920–21, when this Committee was first appointed, the number rose to 299. By 1921–22 the number was 353. But during the same period One-year Courses had been growing yet more rapidly, numbering 329 in 1921–22, or four times the number in 1913–14.

In 1923–24 the Board undertook to include in their Estimates a sum sufficient to provide for a twenty per cent. increase in the number of classes, and the number rose to 392 University Tutorial Classes and 359 One-year Classes. At this point new conditions were introduced.

The Board then issued new Regulations, and the number of classes at once showed a great increase; for example, University Tutorial Classes during the session numbered 454, and Preparatory, One-year, and Terminal Courses, as they were now called, numbered 526. It was at once clear that, however much the new Regulations acted as a stimulus to University Tutorial Classes, they encouraged other types of courses still more, a fact which became apparent in 1925–26 when University Tutorial Classes numbered 493 and the other courses 606. The most important general provision of the new Regulations was Article 10, which set out the general principle adopted for the purposes of the Board's grant; viz. the payment of three-quarters of the fee paid to the teacher, subject to a fixed maximum, deductions being made in the event of failure to comply with requirements of attendance and written work. The Regulations also provided for grants in aid of extra-mural courses supervised by universities and university colleges. The maximum grant payable in respect of a University Tutorial Class was raised from £45 to £60, and in special circumstances £75. University Extension Courses and Preparatory Classes, which had previously been aided under the Regulations for Technical Schools at low rates, based on the number of students multiplied by the number of hours of attendance, were now brought under more rigorous standards of attendance and written work and were given a much higher grant. In each case the maximum rate of grant was made £45 for a 48-hours' course. The chief distinction between Preparatory Classes and Extension Courses is that the former must give a suitable preparation for students intending to proceed to Tutorial Classes, while the latter are self-contained. Extension Courses are usually organised in lecture periods, which may be attended by a general audience, followed by class periods, attended by persons some of whom are willing to do written work. There are also grants in aid of Terminal Courses, which meet for not less than 1½ hours a week for 12 weeks, written work not being required, and of One-year Courses meeting not less than 1½ hours a week for 20 weeks, written work being required. The grant for the former was made £8 (in special circumstances £12) for 24 hours' instruction.

In some areas Authorities definitely assume financial responsibility for courses organised by voluntary bodies; conspicuous examples are Durham, Kent, and the West Riding of Yorkshire. Their number is very large. Most authorities, however, are content to make a contribution in aid of courses organised by voluntary bodies. The great majority of authorities are now interested in A.E.; in fact 56 out of 62 county councils, and 67 out of 82 county borough councils, were helping A.E. in some way during 1929. Certain organisations, such as the National Adult School Union and the Co-operative Union, which provide for A.E. do not seek public assistance, and prefer

to pursue their aims and to organise their work free from any external control. There are many bodies with religious or social aims which promote some A.E. but cannot be said to have A.E. as their principal activity.

University Extension Courses and University Tutorial Classes no longer exclusively represent A.E. in the eyes of the community; year by year they increase in numbers, but decrease in proportion to the whole. In 1913–14 University Tutorial Classes far out-numbered the other registered classes of the Workers' Educational Association. When account is taken of all classes for which Local Education Authorities assume financial responsibility, it is clear that now classes of shorter duration far outnumber University Tutorial Classes.

The establishment by the London County Council of a number of Literary Institutes in 1919, after an interrupted period of experiment on a small scale, is one of the landmarks in the development of A.E. These institutes, some ten in number, have about 5000 students enrolled in them, who are mostly men and women between the ages of 20 and 40, who have received a good elementary education followed often by some ... l education. ... ed under the ... 925–26 were: ... Economics, ... Geography, Æsthetics, Music, Art, Natural Science, Biology, Sociology, Philosophy, Psychology, Mathematics. In the London Literary Institutes the subjects of study are differently distributed, Literature, History, and Æsthetics taking a much more prominent place. In the London Men's Institutes the curriculum is again of a very different character, handicrafts, hobbies, and Physical Exercises taking a prominent place.

Adult Education in the United States.—A. E. in the U.S.A. chiefly started during the middle decades of last century, in the evening schools founded by the Christian Churches ... ons. Pre- ... ided in the ... were some- ... ter to the British Ragged Schools. In the course of tim ... to improve ... tage of the ... mained the ... children wer ... A stimulus ... given to A. E. after the Slave War, through a public-spirited endeavour to deal with new problems. The desire of the Methodist Episcopal Church to improve the education of its Sunday School teachers, led to the formation of short settlements lasting a few days or weeks, during the summer. Very rapidly these Summer Schools developed in character and widened in the range and variety of subject-matter. The Chautauqua (*q.v.*) Movement, as it is called, from the name of the first school, quickly travelled through the U.S.A., and hundreds of Summer Schools came into existence, with aggregate scholars that can now be reckoned in millions. Very few of these are associated with the original Chautauqua School, and frequently they are financed by the tn. in which they are held, or by an interested committee. They are not run for profit, and are largely independent of each other or of any central body. The Young Men's and Young Women's Christian Associations of America have long made a special feature of A. E. in a great number of tns. and cities, carrying on work of a nature comparable to that of the London Polytechnic. In the great cities such bodies as the Pratt Institute, the Cooper Union, and the ... body and ... sist adult ... Colleges exercise a larger influence in America than in any other country, and though some of these are rather more famous as triumphs of advertising skill than for educational benefits, there appears to be a useful service in much of their work, especially in remote and less populous districts. Normal education is carried into later years of youth and adolescence in America than in most other countries, and the strenuous endeavour of most young men and women who can afford it to matriculate or to obtain a degree of some kind before ceasing their studies, tends to increase the volume of adult education. Among apprentices and those engaged in industry this spirit is also evident.

Adulteration (Lat. *adulterare*, to defile or render impure), the act of mixing with a commodity some inferior stuff, or abstracting some material of value for the purpose of extra profit.

The practice of A. has been known from the earliest times. The merchants of the E. and of anct. Greece and Rome were in the habit of mixing inferior wines with good in order to enhance their own profit. Complaints are met with as early as the reign of King John of the roguery of brewers, bakers, and other tradesmen in England, and at the present time, despite all legislation, the A. of various kinds of food-stuffs still exists.

In earlier times the dishonest attempts of manufacturers were crude and fairly easy of detection, but in these days the adulterator has called chemical science to his aid, and so well is he able to counterfeit the genuine article that it is only by pitting against him the trained analyst that he can be brought to book. It is probable, fortunately, that the measures directed against A. are gradually taking effect, and, coupled with the greater desire of the consuming public for pure food, will do much to abolish a dangerous practice. It may at once be admitted that the fault is not all on the side of the vendor of the adulterated articles. His excuses are, no doubt, often specious, but the average customer demands an attractive appearance in the goods he buys, which can only be obtained by the addition of injurious matter. Preserved peas naturally lose their bright green colour, which, however, can be renewed by the addition of copper sulphate. Consumers demand bright green peas, therefore they have to accept copper sulphate in addition. Many people suppose that milk rich in cream has a yellowish tinge. Now pure milk is almost white, so that the milkman has to colour his milk artificially to make it saleable. So much may be said for the difficulties of the tradesman, but when he protests that certain added materials are quite harmless, that they improve the flavour, or that the market price forbids a pure article, in the interests of the public health he should be repressed. Many adulterants may not be actively injurious and yet may do a great injustice to poor and ignorant people. They expect certain qualities in their food, and are defrauded if that standard is not reached. The practice of adulterating milk with water does not lead to poisoning, but it often means insufficient nourishment for the infants of poor parents.

Various Acts have been passed relating to the A. of food and drugs, the most important being those of 1875, 1887, and 1899. They provide that food and drugs must not be mixed, coloured, stained, or powdered with any material injurious to health. No person is liable to conviction if he can show that he did not know of the A., and that he could not by the exercise of reasonable diligence have ascertained the fact. No person may sell to the prejudice of the purchaser any article of food or any drug not of the nature, substance, or quality demanded. It is not, however, illegal to add any ingredient not injurious to health if required for the preparation of the food or drug as an article of commerce, provided the ingredient is not added fraudulently to increase the bulk or weight, or to conceal any inferiority in quality. Ingredients which are not of an injurious or a fraudulent character may also be added if the article is labelled to the effect that it is mixed. The penalties for infringement are limited to £50 for the first, and £100 for a subsequent offence. The Margarine Act of 1887 provides that all butter substitutes or mixtures of butter and substitutes are to be marked, when exposed for sale or packed for storage or transport, with the word 'margarine' in large letters.

Many common food articles are still adulterated. Milk is adulterated by adding water, by abstraction of cream, or by adding borax or soda as preservatives. Butter and cheese are adulterated by adding margarine and other fats. Bread, tea, and sugar are seldom adulterated. Lard is adulterated with cotton-seed oil, as also are certain oils, such as olive oil. Jams are adulterated by substituting cheaper fruits, by using starch glucose instead of sugar, and by adding colouring matter. Coffee is often adulterated with chicory. Cocoa is adulterated with sago-flour and other forms of starch. Beer and spirits are adulterated by adding water.

All the States of the U.S.A. have passed laws for securing the purity and cleanliness of food. Most of these State laws adopt the general principles to be found in the Federal law as enacted in the Federal Food and Drugs Act, 1906, and amending Acts. This Act gives the Federal Gov. jurisdiction over all food intended for commerce, whether for foreign countries or as between State and State; but each of the States has control over all the food produced and consumed within its own borders. The above Act provides that food shall be free from injurious ingredients, etc., and that packages shall clearly state the quantity of the contents. It also provides two remedies for infringement, namely criminal prosecution and seizure of the goods, and both may be exercised concurrently. The purity or freedom from adulterants of such important foods as meat and tea is safeguarded by special Acts, empowering inspection by the Federal authorities. Tea shipments for entry into the U.S.A. are inspected in order to secure that the tea as to quality conforms to the standard laid down by the Secretary of Agriculture; while under the Meat Inspection Act, all animals intended for slaughter, all carcasses for food, and all meat for canning, curing, etc., are examined, the inspection thus beginning with

the live animal and ending only when the finished product leaves for consignment, whether from State to State or to a foreign buyer.

Adultery means sexual intercourse contrary to the canon or civil law, and in anct. legal codes it was, in theory at any rate, harshly punished, in many cases the death penalty being prescribed. Some modern states still regard A. as a crime, and treat it as such, some of the states in the U.S.A., until recently, punishing it by fine or imprisonment. In England A. is subject to no penalty other than social ostracism, but is ground for a civil action for damages and for divorce. In the Fr. penal code it is excusable homicide if the husband kills his wife and the adulterer if he finds them *in flagrante delicto*. *See* DIVORCE.

Ad valorem (Lat., according to the value), a commercial term implying that calculations for stamp duty, etc., are made on the value of a bond or other article.

Advancement, a legal term for money advanced to a minor or other beneficiary under a will or settlement with a view to the 'A.' or benefit of that person. A common form of A. is that of finding the capital for setting a person up in business, but money expended on education or apprenticeship is not technically considered A.

Advent (Lat. *adventus*, the coming) is the season of four weeks preceding Christmas appointed in the Eng. and other Christian churches for preparation for the festival of Christmas to celebrate the nativity or manifestation of Christ. In the same way Lent is the season of preparation for the festival of Easter, and formerly A. was kept almost as strictly as Lent, public amusements and festivities being prohibited, and fasts kept. The first Sunday in A., or A. Sunday, as it is commonly called, is the Sunday, whether before or after, which falls nearest to St. Andrew's Day (Nov. 30); and since the sixth century A. Sunday has been the commencement of the eccles. year, except in the Gk. Church, in which it begins on St. Martin's Day (Nov. 11). It was formerly the custom to regard the coming of Christ as fourfold: 1, at His nativity; 2, at the hour of death to receive His disciples; 3, at the fall of Jerusalem; 4, at the day of judgment. It is now usual to speak of His coming as twofold: His first coming at His nativity as the Saviour of the world, known as the 'First A.,' and His second coming at the day of judgment, known as the 'Second A.' During the season of A. the lessons are chosen so as to exhort people to think of His second coming. In the Scriptures themselves the second coming of Christ is spoken of differently in different passages, and it has been a subject of much controversy amongst theologians as to its time and form.

Adventists (Lat. *adventus*, the coming), or Second A., is the collective name of six groups of religious sects in America: the Evangelical A., Advent Christians, Life and Advent Union, Age-to-Come A., Seventh Day A., Church of God. They are Protestant sects, and all but the last two groups are congregational in gov. They had their origin in the agitation in 1831 of William Miller, who from his studies of the biblical prophecies deduced that the end of the world would come in 1843, and that Christ should then make His second appearance on earth. He soon gathered together a large following, who adhered to him even after his prophecy failed; in 1844 they were again disappointed in the millennium theory, but in 1845 they determined to look for the second coming of Christ at a near but indefinite date, and this is now the accepted belief.

The Evangelical A. (1845) believe in the resurrection of the soul, that the just will reign with Christ through the millennium, and the unjust shall be tortured in hell for ever. *The Advent Christians* (1861) hold that at the second coming the just will receive immortality, the unjust annihilation. *The Seventh Day A.* (1845) is the largest group, holding the seventh day sacred as the Sabbath, believing in some mystic biblical prophecies, the triumph of the righteous and destruction o[illegible] *Church of God* [illegible] foregoing in [illegible] application of the two-horned beast to the United States, and in the acceptance of Mrs. Ellen J. White's writings as inspired. *The Life and Advent Union* (1860) believe that the wicked will remain asleep throughout eternity, while the good shall obtain [illegible] *Age-to-Come* [illegible] ternal life is [illegible] rist. There [illegible] Adventists of all kinds. *See* D. T. Taylor's *The Reign of Christ*, 1889; J. G. Wellcome's *History of the Second Advent Message*, 1874; Mrs. E. J. White's *Great Controversy*, 1870.

Adventure Bay, in Bruné Is., off S.E. coast of Tasmania, was discovered by Captain Furneaux in 1773, and named after his ship, the *Adventure*, which was later used by Captain Cook on his visit to the bay in 1777. *See* Captain J. Cook's *Third Voyage*, vol. i., 1784; W. Bligh's *Voyage to the South Seas*, 1792.

Adverb (Lat. *adverbium*, from *ad*

and *verbum*, word, verb) is the name of one of the parts of speech used with verbs, adjectives, or other As. to qualify their meaning, just as the adjective is used with substantives, *e.g.* in 'He sings well,' 'well,' is the A. qualifying the verb 'sings'; and in 'An extremely delicate child,' 'extremely' is the A. qualifying the adjective 'delicate.'

Advertisement. Whether one agrees with the parody, 'Sweet are the uses of A.,' or regards A. as a necessary evil, it must be conceded that A. is one of the distinguishing features of the present age. At all periods of history A. has been employed in one form or another, but has never attained to such a pitch of ubiquitousness and persistency as at the present day, and in no country is the art—for such it is—of A. more developed and more employed than in Great Britain and the United States. But the age of machinery and the period of *laisser faire* necessitate A., and although the clamour of modern commercialism has its abuses, there is no doubt that the advantages of advertising outweigh the drawbacks. It will be well to consider A. as falling under two categories: first, legally and publicly, and, second, in its commercial and more strident form. But before doing so a few words will briefly dispose of A. in anct. times. That invaluable source of our information of the intimate life of Rom. civilisation, namely, the excavated ruins of lava-buried Pompeii and Herculaneum, shows that A. was employed in the time of the Cæsars. On the walls of what were presumably the most-frequented thoroughfares were As. of various kinds of baths, announcements of gladiatorial shows, and notices of plays. In Rome at the same period a daily gazette called the *Acta Diurna* (*q.v.*) contained public notices and As., and among the Greeks a public crier was employed to announce the wares of the shopkeeper. The public crier, or bell-man, persisted through the middle ages, and is still to be found in small provincial tns. Nowadays public and official As. are made by posting them at church doors, as in the case of lists of parochial voters, or in the columns of the *London Gazette*, pub. by the gov., twice weekly. Royal proclamations are made in this *Gazette*, and it is also the channel by which announcements are made as to bankruptcies, Army Commissions, Orders in Council, etc. Many other official announcements required to be made by statute or by an order of the court are pub. in the *Gazette*, *e.g.* notices by trustees, but as the *Gazette* has but a small circulation generally, an A. in it is not considered sufficient public notice of a dissolution of partnership. The popular supposition that an A. by a husband to tradesmen not to supply goods to his wife relieves him of his liability to meet their bills is erroneous; such intimation must be given to each individual tradesman. If in an A. for lost or stolen property the advertiser intimates that no questions will be asked as to how the person responding to the A. came by the missing property, then the advertiser commits a criminal offence, and is liable to a fine of £50, as are also the printer and publisher of such announcement. In some cases the publication of an A. is *ipso facto* considered as making a contract with the respondent to the A., as when a railway company or steamship line advertises for goods. Such advertisers are bound to accept the goods tendered for transport on the terms of A., provided, of course, in the case of the vessel, that it is not already booked up. An auction once begun and advertised as 'without reserve' must be proceeded with or a contract is broken.

Commercial advertising may be said to embrace two depts.: A. by poster and otherwise in places of public resort, and A. in papers, books, and other reading matter. The first Eng. newspapers contained no As., but a journal pub. at the middle of the seventeenth century, the *Mercurius Politicus*, had small As. of the 'situations wanted' type. With the rise of newspaper advertising the character of the newspaper has undergone a complete reversal. Formerly pub. to support some party or cause, and finding in that its *raison d'être*, and with the revenue derived from As. as a subsidiary item. Some modern newspapers have the appearance of being little more than a number of sheets containing As. of goods for sale, made palatable for the public by the inclusion of news. Evidence of this is afforded by the fact that the A. manager of a newspaper receives sometimes three times the salary paid the editor, and that many important papers style themselves 'The Advertiser,' but no modern newspaper could possibly be run without the revenue derived from As. Hence the opposition some years ago offered by a great journal to a proposed soap combine which would have deprived it of As. derived from a competition that would cease with amalgamation. The establishment of the *Times* in 1785 may be regarded as the commencement of the period of modern A. From 1712 to 1853 a varying revenue tax was imposed on As. The annual revenue

derived from this was £170,000 in 1832, but the following year the duty was considerabl...

...Among other forms of A. which may be briefly enumerated is that of hand-bills, sandwichmen, illuminated sky-signs by night of various and varying colours, boards and metal sheets of all descriptions on rolling-stock, on railway stations, and at the railway and roadside. But most common of all forms of outdoor A. is the poster. Many of the posters of large firms contain pictures of high artistic merit. To the aid of A. have been called painters, like Millais and Herkomer, black-and-white artists, like John Hassell and Charles Harrison. One firm of soap merchants, Messrs. Pears, united the art of artist and poet in an A. which was the joint production of Walter Crane and Sir Theodore Martin. ...

post ...
to b ...
of i ...
the ...
men ...

suggests that there is a danger of confusing its functions with those of the newspaper A. It is the function of the latter to attract attention and stimulate the wish to buy, whereas that of the poster is merely to act as a reminder, though it may indirectly lead to the desire to purchase. Changes in schools of painting, too, are reflected in the poster, though it is still maintained that the better the painter the better the poster. Some experts in advertising aver *e.g.* that Manet and Bonnard are better poster artists than were Millais or Leighton, because they were better painters, but the point is obviously highly controversial. What seems clear is that the two arts are distinct, and that until the distinction is properly recognised, there will continue to be a compromise. The art of Brangwyn, as exemplified in railway company posters, offers, however, a high degree of symbolical skill and pictorial beauty which are not easily rivalled, lending, as they do, a genuine dignity to the subject with which the A. is associated. In recent years there has been a marked improvement in the use of hoardings, though hostility has been aroused by a too liberal display of them to the detriment of rural beauty. It is to be borne in mind that the purpose of the hoarding-poster is to draw the attention of the individual who happens to be passing, whether riding or walking, whereas the so-called 'false' poster is one which is designed for the stationary person, and may therefore contain more letterpress. Full use is made of temporary hoardings in cities where the construction of large buildings is in process, and grandiose and startling effects are occasionally produced on such hoardings; but the tendency to perpetuate vast signs by affixing them permanen...
be deplored as ...
nique of post ...
according to s...
the true individual note be sought and achieved at all costs, and that this is to be attained by avoiding as the main colour the colour which happens to be dominant at the time; and similarly, if much letterpress happens to be in vogue, this should be subordinated to concentration on pictorial work; while, again, if all advertisers of a particular thing, as *e.g.* sauce, favour a mammoth bottle, the individual note may be achieved by employing some other object altogether, provided it be striking and directly related to the subject advertised. It is probably becoming universally recognised that good taste in advertising pays. There is, at all events, a manifest striving after the ideal. A real or quasi-literary touch is given, *e.g.* to ...
which appear in ...
in the carriages ...
ground railway ...
suggestive of vernal delights are introduced to attract the passenger to these railways, although at first sight he may not commonly associate such amenities with underground travel. Good slogans may well repay the ingenuity expended on them. Here again technique has evolved its principles. A good slogan should directly or by necessary inference apply to the article advertised, and not rely merely on the name being mentioned casually or in some other part of the A.; the slogan may be alliterative, but in any event should have a lilt or rhythm which compels recollection; and it must contain some one or more key-words upon which the full emphasis naturally falls. Examples are 'The Prudential has the Strength of Gibraltar,' 'If it's Wolsey, It's Wool,' 'It's the Little Daily Dose that Does It,' 'Bovril Puts Beef into You,' 'These Hands may be Yours,' in all of which phrases some or all of the above desiderata are exemplified. The requirement of a good key-word is illustrated in the famous political slogan 'We will have a White Australia,' which had the effect of putting the protectionists in power in Australia and, incidentally, proved the important part mass suggestion may play in advertising. Related

to poster advertising are scintillating signs, a form which has been greatly developed in recent years. It seems doubtful whether these signs have an efficacy equal to that of posters.



[*Topical Press*

ELECTRIC SIGNS, PICCADILLY CIRCUS, LONDON

They are fascinating and hold the eye, but the mind forgets the thing advertised in the brilliance of the effect. Trafalgar Square at night is an entertainment in itself, but the element of the 'reminder' is absent, though a theatre or restaurant on which such a sign or halo of still lights appears undoubtedly rivets the attention in an enduring manner.

Advertising Agencies.—Advertising agencies in Great Britain are gradually acquiring a stronger position, but do not as yet enjoy the status of such agencies in the United States. In America, the advertising agent is recognised by newspaper and advertiser alike as the chief factor in the practice or business of advertising, and in consequence the problem of commission has been solved satisfactorily long ago. In Great Britain, however, discussion is still heard on the position of, or even the necessity for, the agent. There is an Association of British Advertising Agents, to which most agents belong, but it is not necessary to be a member; and, generally speaking, the position of the agent in relation both to newspapers and advertisers stands in need of definition. In earlier days the agent had no part in the preparation of copy or layout, but to-day he vies with the advertiser and the advertising staff of a newspaper in the art. Fifty years ago, the agent merely sold newspaper space, but later he suggested the best use to which such space might be put. This change from the position of a mere canvasser was for the better, but the change could not be permanent while the impulse to advertising came from the manufacturer or trader; and it was only when the agent began to make use of propaganda in favour of advertising that the real change came. Rates remain a difficult question, because the large business concerns so frequently employ their own advertising managers, while again the newspapers also employ skilfully managed advertising departments. Thus the agent still is, for these reasons, to a certain extent without a protector; but the newspapers are beginning to recognise that unfair competition only results in bad business all round, because the advertiser becomes the victim of a system which looks only to rates rather than to his interests.

Advertising in the United States of America.—America has so long been regarded as the home of advertising that until very recent years the whole world, including Great Britain, has been satisfied to accept her methods as a pattern and to measure success by the speed with which her newest ideas could be adopted. Although other nations are now striking their own characteristic notes, America still remains a leading force in Advertising. American advertising falls into two main groups, Press and non-Press. This clear division should be recognised, in view of many modern movements, and particularly in relation with the fact that the great advertising

agencies of America, which are becoming increasingly a close corporation, provide the main revenues of the newspaper firms, which are themselves closely-knit corporations. In consequence the American Association of Advertising Agencies is an exceedingly powerful body, which [illegible] advance in A. have been prominent. The close association, however, of two great financial interests is being watched with some anxiety and pressure is being brought to bear against dubious uses of publicity. The Association maintains a large staff, including a most useful research department, and undertakes a great deal of work for the benefit of its members. Its endeavours to prevent price-cutting and passing-back commission are, however, regarded with some anxiety by independent minds, as it is suggested that two great financial interests in close co-operation may not always work for the public good.

Press advertising falls into two departments, which appear to be worked on two entirely different principles: (1) general national advertising, and (2) mail-order advertising. In the first of these, where goodwill is built up by a prolonged and persistent series of efforts, the very best available skill in art and writing is eagerly sought for, with results that are often highly pleasing. In the second, where immediate response is essential, every inch of space is crowded to capacity. Posters, sky-signs, cinema films, illuminations, letter-box publicity are among the leading methods outside the Press, each one of which tends to become a specialist activity in itself. America is very susceptible to new fashions in advertising, and any idea that gains great prominence is swiftly followed. Thus the craze for aeroplane sky-writing of a few years ago is now being followed by great displays of flood-lights and illuminated and flickering sky-signs. To such an extent is this being carried on that the brilliant illumination of Broadway at night has gained it the name of The Great White Way. Probably the greatest extension of all in America has been in the setting up of special publicity staffs inside thousands of separate firms, who were at one time content to [illegible] A mail-order [illegible] ld regard the [illegible] as the chief [illegible] and stand or [illegible] efforts. The popular American attitude upon this matter is 'Advertising *is* our business, and if we can't do our own business we ought to be out of trade.' Specialists, too, have a vogue. Slogan-writing, form-letter writing, illustration, copy-writing, are now not only undertaken by free-lance workers, but also by firms that cater for special needs.

[Consult J. Murray Allison's *First Essays on Advertising* (1926), in which an exhaustive bibliography on Advertising will be found well [illegible] *Advertising: Its Principles and Practice*, by Tipper, Hotchkiss [illegible] and Parsons; [illegible] Charles Higham [illegible] *Advertis*[illegible], by Muroy; *The Art of Publicity,* by Spiers; *Billposting*, by Cyril Sheldon; *First Principles of Advertising*, by Wilbur D. Nesbit; *Lectures on Advertising*, by John Lee Mahin; *Modern Advertising*, by Calkins and Holden; *What I know about Advertising*, by T. B. Lawrence.]

Advocate (Lat. *advocatus*, from *advocare*, to call to one's aid) is the name given in anct. Rome and in many modern states, including Scotland (*see* ADVOCATES, FACULTY OF), to a forensic orator. The Eng. term for this is barrister or counsel (*q.v.*). An A. of Aberdeenshire is not a barrister, but a solicitor, it having been decided by M'Pherson *v.* Watt, 3 App. Cas. 254, that solicitors in that county had a right to the appellation. Prior to 1857, the name A. was given to those licensed by the archbishop in the Court of Arches, but since then barristers have been admitted to the eccles. courts.

Advocate, Lord, or, as he was called prior to 1598 and is still sometimes called, King's A., is the prin. law officer of the crown for Scotland, his duties corresponding in the main to those of the attorney-general for England. His office was created by James III. in the year 1480, and his multifarious duties include that of public prosecutor. He has always played [illegible] political affairs [illegible] and for a long w[illegible] secretary of stat[illegible] was *ex officio* [illegible] of the old Scotch parliament, and after Walpole abolished the office of secretary for Scotland, and before the revival of that office in 1885, his power in Scotland was of a most far-reaching nature. Nowadays he is always a member of the ministry, but not of the cabinet, and he and his assistants, the solicitor-general and the four As.-depute, resign when the gov. who appoints them resigns. A salary of £5000 (and perquisites) is paid to him, but he is not precluded from taking private prac-

tice. The L. A. is often, but not always, a member of the privy council, but while in office is invariably addressed as the Right Honourable.

Advocates, Faculty of. All members of the Scottish bar belong to this body and are called As. Although their name is derived from the Fr. *avocat*, in privileges and liabilities their position closely resembles that of an English barrister. The faculty was founded in 1532, when James V. instituted the College of Justice, of which it forms part. Limited in the first instance to ten, the members of this faculty now exceed 400, but it is computed that the members who practise are not half this number, and fewer still make a living by the profession. The fact of graduating in the two examinations set by the faculty is, however, considered most useful as leading to official or public appointments, and there is consequently no dearth of candidates for admission to the faculty. The first examination is in general scholarship, the second, after the lapse of a year, is in law. The fees payable by the would-be member amount to nearly £350, and include the subscription to the widows' fund of the body and to the As. Library (*q.v.*) maintained by the faculty. The dean, or chairman, of the faculty is elected yearly, and has precedence at the bar even over the crown law officers. The latter, together with the judges of the Court of Session and the prin. sheriffs, are always selected from the faculty, and only members of it are allowed right of audience in the above-named court. The faculty continues to this day the duty imposed on As. by a statute of 1424, viz. assisting poor litigants (Poor's Roll, *q.v.*).

Advocates' Library, the largest library in Scotland, and exceeded only in size by the Bodleian Library, Oxford, and the British Museum Library, London, is situated in the building of the Parliament House, Edinburgh. It was founded in 1682 by Sir George Mackenzie for the use of the Faculty of A. of which he was dean, and it has been maintained by them ever since. In 1692 the library had about 3000 volumes, but at the present day the number exceeds half a million, including over 3000 MSS. Since the first Copyright Act, 1709, the A. L. has been one of the libraries entitled to receive a copy of every book copyrighted.

Advocation, the process by which, prior to its abolition in 1868, an appeal was made from the Scotch Sheriffs' Court to the Court of Session.

Advocatus Diaboli (the devil's advocate), the name of one appointed in the Rom. Catholic Church to set forth possible objections to any person whom it is proposed to canonise, *i.e.* admit to the calendar of the saints. Opposing the devil's advocate was God's advocate (*A. Dei*). As the objections were generally not valid, and only made as a matter of form, the term A. D. has come to be applied generally to any person who knowingly puts forward arguments with which he himself is in disagreement.

Advowson, the right of presenting an eccles. benefice or 'living' in the Church of England. Such right rests in those who have founded and endowed churches, their heirs or executors, and those to whom they have transferred the right. An A. is a form of real estate and, subject to certain statutory regulations designed to prevent simoniacal practices, may be freely disposed of. It may pass with the sale of a manor, in which case it is called an *A. appendant*, or separately as an *A. in gross*. Where the patron is a Jew his right lapses to the archbishop of Canterbury, and if the patron be a Roman Catholic the right of presentation goes to the University of Oxford or Cambridge, whichever is nearest to the benefice.

Adye, Sir John Miller (1819–1900), British soldier, son of Major J. P. Adye, was *b.* at Sevenoaks, Kent, and educated at Woolwich. He served during the Crimean War and Indian Mutiny as assistant adjutant-general of the Royal Artillery. From 1870–75 he was director-general of artillery, and in 1882 served in Egyptian campaign; from 1883 to 1886 he governed Gibraltar, retiring in the latter year. He unsuccessfully contested Bath in 1892. Publications: *The Defence of Cawnpore*, 1858; *Recollections of a Military Life*, 1895; and *Indian Frontier Policy*, 1897.

Adytum (Gk. ἄδυτον), a place that may not be entered. In anct. temples it was the innermost and secret chamber, where oracles were delivered and mysteries performed, and only the priests were allowed to enter therein.

Æacus, the son of Zeus and Ægina, a daughter of the river-god Asopus. He was king of the Myrmidons, and owing to his justice and piety was made, after his death, one of the three judges in Hades. *See* Horace, *Odes*, ii. 13; iii. 19; iv. 8.

Aeby, Christoph Theodor (1835–85), Swiss anatomist, was *b.* near Pfalzburg, and studied medicine at Basle and Göttingen. He was appointed professor of human and comparative anatomy of Berne University in 1863, and pub. sev. medical works, among which are *Eine neue Methode zur Bestimmung der Schädelform von Menschen und Säugetieren*, 1862; *Die Schädelformen des Menschen und der*

Affen, 1867; and *Ueber das Verhaltnis der Mikrokephalie zum Atavismus*, 1878.

Æcidium (Gk. *αἰκια*, injury), or Cluster Cup, a fruit of a parasite plant belonging to the Uredineæ. It is also the name of the genus of the fungi; *A. cancellatum*, the pear Æ., gives the pear-tree leaves a warty appearance in autumn; *A. berberidis*, the barberry blight, is responsible for the bright orange powdery-looking substance seen on the barberry, in reality the spores of the fungus.

Ædiles were Roman magistrates, first appointed 949 B.C. and elected from the plebs. At first they were the officers of the tribunes, and had to keep the decrees of the senate in the temple of Ceres (Livy, iii. 6, 55). The two curule or patrician Æ. were first elected 365 B.C. (Livy, vi. 42). They had the care of the temples, public buildings, the sanitation of the city, the roads, presided at religious celebrations, and inspected the markets, weights, and measures. Julius Cæsar appointed two more plebeian Æ. 45 B.C. to look after the corn supply.

Ædui, or Hædui, a powerful Gallic race who lived between the Loire and the Saône, and were the first to form an alliance with the Romans. Their prin. tn. was Bibracte. *See* Cæsar's *De Bello Gallico*, i. 10 *et passim*.

Æetes, son of Helios and Perse, King of Colchis, was the father of Medea and Absyrtus. When Jason came to Æ. for the golden fleece, Medea fell in love with Jason, and after she had helped him to obtain the treasure fled with him to Iolcos, taking with her Absyrtus, whom she killed, and by strewing the pieces of his body on the road detained her father, who was pursuing her. She afterwards returned to her father. Ovid, *Heroides*, xii. 29.

Ægadian Islands, anct. Ægades, Ægates, or Ægusæ, are three small is. off the W. coast of Sicily. In 241 B.C. the Roms. here defeated the Carthaginians in a naval battle, and thus brought the first Punic war to an end. Pop. about 6000.

Ægagre, a species of wild goat or ibex, found in the mts. of E. Europe and of Persia, where it is called Paseng. The oriental bezoar, a stone once supposed to possess medicinal virtues, is sometimes found in its stomach.

Ægean Sea and Islands, the name used by the Gks. and Roms. for that part of the Mediterranean Sea between Asia Minor and Greece. It is now called the Archipelago, containing amongst many other is. the Cyclades and the Sporades. After the Tripolitan War of 1911–12, the twelve is. of the Ægean were under Italian rule. In the Great War, Greece, as the price of joining the Allies in the Dardanelles campaign, demanded the Ægean Islands, but further bargaining by Venizelos (*q.v.*) was stopped by King Constantine, who dismissed his premier. Later in the same year Italy demanded as compensation from Austria-Hungary the [illegible] an Islands (*see* [illegible] In the post- [illegible] was granted all the coasts and [illegible] Æ. S., [illegible] 1919– [illegible] Italy [illegible] twelve islands in favour of Greece, and Greece in return agreed to lease to Italy the site of a coaling station in the islands and to recognise an Italian protectorate of most of Albania.

Ægesilaus I. was king of Sparta during the years 927 to 880 B.C. He was the son of Doryssus, of the family of the Agidæ. His reign was made famous by the laws of Lycurgus.

Ægesilaus II. was king of Sparta during the period 401 to 360 B.C. He owed his position there to the support of Lysander, who wished to reap the benefit of his aid by securing his own way in the adoption of his political reforms, but he was disappointed. In 396 Æ. was sent to defend the Gk. cities against an attack by the Persians. In the following campaign he proved his abilities as a soldier to be so rare that he is recognised as the greatest military genius of the period. In the midst of his activities he was recalled in order to assist the Spartans against the allied forces of Athens, Thebes, Corinth, and Argos. His success now seems to have begun to leave him, and eventually the whole of the Spartan navy, in which he held [illegible] as destroyed. He [illegible] in a subsequ[illegible] hich resulted in [illegible] rms favourable to him. In spite of his advancing age his military instincts remained, if possible, still more active, and he presently embarked on a campaign in Egypt. It was during this war that the irrepressible soldier, aged now 84, died, closing a career of undoubted personal courage.

Ægeus, King of Athens, was the son of Pandion and father of Theseus. He was restored to the throne (from whence he had been driven by the fifty sons of Pallas) by his son Theseus. Theseus went to Crete to deliver Athens from the tribute it had to pay to Minos, promising that he would hoist white sails on his return as a signal of his safety. He, however, forgot to do so, and Æ., thinking his son had perished, threw himself

into the sea. From this event the Ægean Sea received its name.

Ægina, a small rocky is. and tn. in the Gulf of Æ. or Saronic Gulf. On a hill in the N.E. of the is. was the temple of Zeus Panhellenus, the ruins of which still remain. It was occupied by the Achæi (Homer, *Iliad*, ii.) and afterwards by Dorians. It became a place of great commercial importance (Herodotus, ii. 178; vii. 147), and its silver coinage was the standard in most of the Dorian states. In the sixth century B.C. it was an independent and powerful state and the chief seat of Grecian art. In 429 B.C. the Athenians took possession of the is. and expelled the inhab. (Thucydides, ii. 27). Area 32 sq. m.; pop. (is.) 9000, (tn.) 5000.

Æginetan Sculptures, *see* SCULPTURE.

Ægis, a representation of the storm-cloud with snaky lightnings twisting around, was the shield of Zeus, and a token of his power. Athena also wore the Æ. with the Gorgon's head (Horace, *Odes*, iii. 57). It was a symbol of protection.

Ægisthus was the son of Thyestes, whom he placed upon the throne, driving away his uncle Atreus. According to Homer, Æ. took no part in the Trojan war, and during the absence of Agamemnon he seduced his wife Clytemnestra (*Odyssey*, iii. 329). He murdered Agamemnon on his return home, and reigned for seven years over Mycenæ (*Odyssey*, iii. 388). Orestes, the son of Agamemnon, then killed Æ. (*Odyssey*, iii. 242). Æschylus, Sophocles, and Euripides also give an account of this story.

Ægium, a tn. of Achaia, on the Corinthian Gulf, in anct. times chief city of the Achæan League. It was a legendary birthplace of Zeus. Vostitza, the modern tn., exports currants.

Æglé, a genus of Rutaceæ with medicinal properties, related to the family of lemons and oranges. *A. marmelos* is the bael fruit.

Ægospotamos, a small riv. ('goat's river') flowing into the Hellespont and a tn. on it, in Thracian Chersonesus. Here Lysander utterly defeated the Athenians, 405 B.C. *See* Plutarch's *Alcibiades*, 36.

Ægrotat (Lat., he is ill), a medical certificate given to university students to explain their absence from lectures. An 'Æ. degree' is sometimes given to students unable to sit for their final examination on account of illness, but whose known proficiency justifies the bestowal of a degree without examination.

Ægyptus, King of Ægypt, son of Belus, and twin-brother of Danaus. Æ. had fifty sons, and Danaus fifty daughters. Danaus, fearing the sons of Æ., fled with his daughters to Argos, where he was followed by the sons of Æ., who demanded his daughters in marriage. Danaus granted their request, but giving each daughter a dagger, ordered them to murder their husbands on the wedding night. Thus all perished except Lynceus, the husband of Hypermnestra, who did not obey her father's instructions.

Aehrenthal, Aloys L. B., Count Lexa von (1854–1912), Austro-Hungarian diplomatist, Foreign Minister (succeeding Count Goluchowski) from Oct. 24, 1906. He was son of Baron Johann Lexa von A., and was *b.* at Gross-Skal in Bohemia, Nov. 27, 1854; studied law at Prague and Bonn; entered the diplomatic service 1877 as attaché to Paris embassy; at St. Petersburg 1878–83; then Chief of the cabinet to Count Kalosky. At St. Petersburg as Councillor of Legation 1888–94; Minister at Bukarest 1895–99; ambassador at St. Petersburg 1899–1906. Thenceforth he directed the foreign policy of the dual monarchy till his resignation on the day of his death. He was friendly to Italy; had no sympathy with Russian Liberalism, and little belief in the disinterestedness of German support of his annexation (in defiance of the Treaty of Berlin) of Bosnia-Herzegovina Oct. 6, 1908: one link in the chain of causes of the Great War of six years later. He was very formal in his acknowledgment of the Emperor William's 'shining armour' assurance, made Sept. 21, 1910 at Vienna. A. was made a Count (Graf) Aug. 18, 1909. All his efforts were for the aggrandisement of Austria-Hungary. In 1910 he was concerned in an attempt by the historian Friedjung to implicate prominent Serbs and Croats in an alleged conspiracy by means of forged documents. In 1902 he married Pauline, Countess Széchényi.

Æken, *see* BOSCH.

Ælfric, a distinguished Saxon prelate, became Abbot of St. Albans, Bishop of Wilton, and Archbishop of Canterbury from 995 until his death in 1005. He was one of the most learned ecclesiastics of his time.

Ælfric, an Eng. writer who lived at the end of the tenth century. He has been confused with Æ., Archbishop of Canterbury from 995 to 1005, and with Æ., Archbishop of York, but it is certain that he was a pupil of Æthelwold, and most probable that he was an abbot at Winchester. He afterwards became Abbot of Cerne and of Ensham; but he is most celebrated for his two books of *Homilies*, trans. from the Lat., and ed. by Thorpe for the Æ. Society (1844–46). They are a good illustration of the doctrine of the

early Eng. Church. Among his other works are: *A Latin and English Grammar and Glossary* (from which he is called 'Grammaticus'), first printed by Somner, 1659, and included in Professor Zupitza's *Sammlung Englischer Denkmäler*, 1880: *Colloquium*, and *A Treatise on the Old and New Testaments*, besides translations, epistles, and other treatises.

Ælia Capitolina, a name given to Jerusalem by the Emperor Hadrian when he had driven out the Jews and there estab. a Rom. colony *c.* A.D. 132.

Ælianus, Claudius, who lived at the end of the second century A.D., was a Rom. citizen and writer, and a native of Præneste (Palestrina). He was the author of *Variæ Historiæ* (composed in Gk. in fourteen books), and *De Natura Animalium* (also in Greek in sixteen books).

Ælianus Tacticus, *fl. c.* A.D. 100, and wrote a treatise on Gk. tactics dedicated to the Emperor Hadrian. It has been trans. into Eng. by Capt. John Bingham, 1616, and by Lord Dillon, 1814.

Ælla (*d.* 588) was the son of Iffa and grandfather of Oswald, and became first king of the Deirans, 559.

Ælred, Ailred, or Ethelred, St. (1109–66), historian, was *b.* at Hexham, and at an early age entered the household of David I. of Scotland. He refused a bishopric, becoming a monk in the Cistercian abbey of Rievaulx, but later was elected Abbot of Revesby, Lincolnshire, in 1143, and of Rievaulx in 1146. He was noted for his gentleness, asceticism, and the piety of his life, and on a mission to the Picts of Galloway in 1164 he induced the chief to become a monk. His works, which have never been collected in a complete ed., include the *Vita et Miracula S. Edwardi Regis et Confessoris*, *De Bello Standardii* (waged in 1138), and *De Spirituali Amicitia*. *See* 'Vita S. Ælredi' in the Bollandist *Acta Sanctorum*, Jan. ii., p. 39, and T. Tanner's *Bibliotheca Britannico-Hibernica*, 1748.

Aeltre, an industrial tn. of W. Flanders, Belgium, which manufs. canvas and exports oil; pop. 7000.

Æmilian Way (Lat. *Æmilia Via*), a famous highway of anct. Italy which continued the Via Flaminia from Ariminum (Rimini) through Bononia (Bologna) to Mutina, Placentia, and Iediolanum (Milan). It was constructed by Consul M. Æmilius epidus in 187 B.C.

Æmilius, Paullus Lucius: (1) was vice consul at Rome, the first time ith Marcus Livius (Livy, xxii. 35), nd was killed in battle near Cannæ, 6 B.C. (Livy, xxiii. 21). (2) The son the above—became curule ædile, ætor, proconsul, and consul 182 B.C. and 168 B.C. He commanded army in Liguria, and completely feated the Ingauni, 182–1 B.C. 168 B.C. he was in command of war against Perseus, who was fina defeated at Pydna in Macedonia. died in 160 B.C. (Livy, xxxiv.–xl. a xliv.–xlv.).

Æneas, the hero of Virgil's *Ænei* the son of Anchises and Aphrodite was *b.* on Mt. Ida, and was, ne to Hector, the greatest of the Troja heroes. It was not until he was at tacked by Achilles on Mt. Ida that h took part in the Trojan war, and le his Dardanians against the Gks. According to most accounts he withdrew to Mt. Ida after the capture of Troy, crossed over to Europe, and finally settled at Latium in Italy. The account of his wanderings is given in Virgil's *Æneid*. He left Troy carrying his aged father on his back, but in the confusion of the flight he lost his wife Creusa. He sailed to Thrace, and then, misinterpreting the oracle of Delphi, went to Crete, thence to Epirus and Sicily. He was then driven by a storm on to the coast of Africa, where he met Dido, with whom he tarried for a while and who vainly loved him. He then sailed to Latium, founded the tn. of Lavinium, and married Lavinia, daughter of Latinus, king of the Aborigines. Turnus, to whom Lavinia had been betrothed, made war on Latinus and Æ. Latinus was killed and Æ. became sole ruler of the Aborigines and Trojans, uniting both nations into one. Turnus was killed by Æ., and Æ. himself was killed whilst engaged in battle against the Rutulians.

Æneas Silvius, son of Silvius, and grandson of Ascanius, was the third of the mythical kings of Alba in Latium.

Æneas Silvius, Pius II., *see* PIUS II.

Æneid, the greatest work of Virgil, and the national epic of the Roman people. It was completed in twelve books, but as it was not revised Virgil expressed a wish that it might be destroyed. It was, however, pub. after his death by Tucca and Varius. It contains an account of the wanderings and the settlement of Æneas after the siege of Troy. It has been trans. into Eng. prose by Mackail (London, 1885) and by Conington (London, 1870); and into Eng. verse by Gawin Douglas, 1553; Dryden, 1697; C. R. Kennedy, 1861; J. Conington, 1866; W. Morris, 1876; W. J. Thornhill, 1886; T. H. D. May, 1903; and E. Fairfax Taylor, 1903.

Æolian Harp, a musical instrument consisting of a wooden box over which are stretched sev. catgut strings of different thicknesses tuned in unison. When exposed to the wind harmoni-

ous sounds are produced. It is supposed to have been invented by St. Dunstan, but the present Æ. H. was not known until the seventeenth or eighteenth century. It is mentioned in Thomson's *Castle of Indolence*.

Æolian Islands, *see* LIPARI ISLANDS.

Æolian Mode, in anct. music, *see* MODE.

Æolians, one of the branches of the Gk. race, who originally dwelt in Thessaly. From there they settled in N. Greece and Peloponnesus. They also immigrated to the N.W. of Asia Minor, establishing twelve cities along the coast dist. known as Æolis, and to Lesbos and Tenedos.

Æolina, a very small musical instrument, consisting of short elastic metallic springs fixed in a frame, and acted on by the breath of the performer. Some comprise three octaves of diatonic sounds.

Æolipyle, or Æolipile (from αἰόλος, rapid, and πῖλα, a ball), a metallic ball partly filled with water, and having tubes projecting horizontally. When heated steam rushes out of the tubes, setting the ball in motion. It was invented by Hero of Alexandria.

Æolis, *see* ÆOLIANS.

Æolodon (Gk. αἰόλος, moving or movable, ὀδούς, tooth), a fossil crocodile of the family Teleosauridæ found in the Jurassic. It received its name from Von Meyer.

Æolus: 1. Ruler of Thessaly, and founder of the Æolic branch of the Gk. nation. 2. Son of Hippotes, or, according to others, of the god Poseidon. According to Homer he was the ruler of the Æolian Is., and was given power over the winds by Zeus. *See also* Ovid, *Heroïdes*, xi. 65–128.

Æon (αἰών), a word meaning 'age' or 'eternity,' denoting an infinite period of time, also a being that lives for ever. The Gnostics use the term to indicate manifestations from God, *i.e.* spirits which form a separate existence, having influence over phases of the world's progression.

Æpinus, Franz Ulrich Theodor (1724–1802), a Ger. natural philosopher. He is most widely known for his works on research in magnetism and electricity. He pub. *Tentamen Theoriæ Electricitatis* in 1759, and among other works memoirs on astronomy and its kindred subjects.

Æpyornis, a huge wingless bird of which traces are found in post-tertiary deposits in Madagascar. It belongs to a species one class of which is as large as the dinornis.

Æqui, a tribe of anct. Italy. They waged incessant war against the young Rom. republic. Their great stronghold was Mt. Algidus. In 446 B.C. they made their last assault upon Rome. They were eventually sub-jugated by the Romans after a grea[t] struggle which began in A.D. 304.

Aerated Bread is made from doug[h] prepared by mixing the flour wit[h] water strongly charged with carbo[n] dioxide. This process produces th[e] requisite degree of porousness in a fe[w] minutes, as compared with hours b[y] the ordinary yeast method.

Aerated Waters, water artificiall[y] charged with more carbon dioxid[e] than it would dissolve under atmo-spheric pressure, and often containin[g] dissolved medicinal salts or flavourin[g] matter. The use of A. W. was sug-gested by the existence of minera[l] springs where water issues forth wit[h] considerable quantities of carbon di-oxide in solution, causing efferves-cence when exposed to the ordinar[y] pressure of the air. The term A. W. is not here applied to the natura[l] products of springs (*see* MINERA[L] WATERS), nor to liquids like bottle[d] beer, ginger beer, champagne, etc. where the carbon dioxide is produce[d] by fermentation (*see* FERMENTATION).

There are many varieties of machi-nery for the manuf. of A. W., bu[t] they contain the same essentia[l] features. The gas is usually obtaine[d] by treating chalk with sulphuric acid; from the gas generator it passes int[o] a washer, where it is purified by pass-ing through water. It is then store[d] in a gasometer, whence it issues to th[e] condensing apparatus together wit[h] the water or liquid with which it is t[o] be incorporated. Here it is thor-oughly mixed and then bottled unde[r] pressure. The bottles are ofte[n] closed by stoppers held in place b[y] internal pressure, but screw stopper[s] are also used. Larger bottles hav[e] what is called a siphon arrangement. A tube passes nearly to the bottom o[f] the vessel and communicates with a spout by a spring valve; on operatin[g] the valve the pressure of the ga[s] drives the liquid out with some force. The *seltzogene* is a simple arrangement for home use. It consists of tw[o] globes connected by a wide tub[e] reaching nearly to the top of th[e] smaller or upper globe. A narrow tube passes from the bottom of th[e] larger globe through the connectin[g] wide tube to a spring valve communi-cating with the spout. A mixture of tartaric acid and [illegible] is placed in the [illegible] sufficient water [illegible] globe to fill about one-third of the upper globe. Gas is produced when the mixture is moistened; it dissolves under its own pressure in the water in the reservoir, and on operating the spring valve can be withdrawn as in the ordinary siphon. Carbon di-oxide is also supplied in a greatly

compressed form in little steel capsules which are introduced into a specially constructed siphon. On screwing in the top a sharp point pierces the capsule, liberating the gas and supplying the necessary pressure.

A. W. used for medicinal purposes contain potassium bicarbonate (*potash*), sodium bicarbonate (*soda*), citrate of lithia (*lithia*), or compounds corresponding to some of the well-known continental mineral waters. Those used purely as beverages contain a very small proportion of fruit syrup and occasionally colouring matter to give attractive appearance.

Aerial Navigation is the science that deals with all points of practical flying, outside the actual working of the machine itself. It includes fixing one's geographical position, maintaining a course and selecting an altitude favourable with regard to wind and weather.

The best way of fixing position, called the dead reckoning, is by recognising objects on the ground. This, however, is not always possible. In dead reckoning navigation allowance has to be made for wind. Aircraft cannot travel along a set 'track,' unless the 'track' runs fore and aft with the wind. Ordinarily the actual path of the machine is at an angle to its course, called the 'drift' angle. For dead reckoning navigation it is necessary to know the true air speed and the wind velocity. The air-speed indicator gives the speed of the aircraft in relation to the air. It is an air-pressure gauge, and, since pressure decreases with altitude, true air speed is found by adding $1\frac{1}{2}$ per cent. to the reading of the indicator for every 1000 ft. of altitude. There are also instruments—the aero bearing plate and the wing gauge bearing plate—which register the drift of the aircraft and the velocity of the wind.

The Aero Compass consists of a bowl of non-magnetic material filled with liquid and fixed to a mounting constructed to overcome vibration. The iron used in the construction of the aircraft causes a deviation of the compass needle, and this has to be corrected by compensating magnets.

The Altimeter is an aneroid barometer, which records the atmospheric pressure at any altitude. Pressure on the earth's surface decreases in proportion to the altitude. A fall of ¹⁄₁₀ in. corresponds to a rise of 90 ft. The altimeter, however, records changes in pressure due not only to altitude, but also to weather.

The Gyro Turn Indicator enables the pilot to keep his machine level when flying straight and to bank at the correct angle when turning. consists of an air-driven gyrosc which reacts only to motion abo vertical axis and is unaffected rolling or pitching.

A.N. at night or in fog.—The p equipped with wireless telephone never out of touch with earth. he calls up two stations havi directional finding aerials, they, working in conjunction, can plot t position of the aircraft and infor the pilot. If the aircraft is its equipped with a search coil, th pilot can find the direction of an stations within range, and plot h own position lines on a chart.

Night-flying is made simpler by the aerial lighthouse. The Neon red-flash lamp, installed at Croydon, is specially suitable for fog, and enables the aircraft to make a safe landing. This can be also ensured by the Loth leader cable, which is electrically charged and sets up a magnetic field. Night-flying is being put into operation along the main air routes.

Aerial Laws.—The first International Air Convention, 1919, laid the foundation of trustworthy communication by air between one country and another. At this time separate provisions were made for Germany under the Treaty of Versailles, articles 313 to 320. When Germany became a member of the League of Nations, these were abrogated, and Germany now abides by the International Convention. The main clauses of the convention established a nation's sovereignty over the national atmosphere, made a certificate of airworthiness obligatory for all machines, and forbade the carrying of such cargo as high explosives from one country to another. An international commission for A.N. was also set up to deal with all points of aerial law.

See H. E. Wimperis, *Primer of Air Navigation*, and J. E. Dumbleton, *Aerial Navigation*.

Aerial Perspective, see PERSPECTIVE.

Aerial Warfare. Military aviation was in the experimental stage in 1912. The Central Flying School at Upavon was opened in that year and a beginning was made in the instruction of pupils in map-reading and signalling. In the same year military aeroplane trials were held on Salisbury Plain with a view to finding the most suitable type of fast good-climbing machine, able to take off and alight on rough ground, and to pull up within a reasonably short distance after alighting. These trials did not evolve a suitable machine, but they gave a real stimulus to the aeroplane

industry. Progress was rapid thereafter and early in the war a good two-seater machine could rise to a height of nearly 10,000 feet in less than 10 minutes. In the Army manœuvres of 1912 the reconnaissance work of the aeroplanes was a complete vindication of the Royal Flying Corps, in spite of the fact that previously, in bad weather, their co-operation in cavalry divisional training had not been highly successful. Only biplanes were used, monoplanes being forbidden owing to the record of fatal accidents. But the sole use in war for which the machines of the military wing of the Royal Flying Corps were designed and the men trained was reconnaissance. This was so up to the beginning of the Great War. It was in the stress of war that experiments in other directions, such as the regulation of artillery fire, were applied with practical effect on a large scale. The British military wing was much smaller than the military air forces of either France or Germany, and was designed merely to operate with a C-Division Expeditionary Force as the 'eyes' of that force. Later, when the Germans were forced back from the Marne (Sept. 1914), the function of co-operating with the artillery became one of the first importance. During the war, too, the aeroplanes usurped many of the duties hitherto believed possible only for the airship—namely, aerial photography, bombing, and the sending and reception of wireless messages. The performance of these duties was, however, postponed until such time as the Royal Flying Corps grew sufficiently in numbers to be able to do them without jeopardising the more essential work of reconnaissance.

The naval wing of the Royal Flying Corps developed on different lines from the military wing. Co-operation with the Navy required conformity to the doctrine that the best defence is attack. Though aircraft were capable of defending the British coasts, they were not as yet (1912–13) in theory capable of carrying war whithersoever the fleet might go. In 1913 the Admiralty adopted the policy of evolving three new types of machine, an oversea fighting seaplane capable of operating from a battleship as base; a scouter to work with the fleet at sea; and a home-service machine for driving back enemy aircraft from our coasts and for patrolling the coast. Progress was slower than with the military wing because the problems were more difficult. The detection of submarines from the air and the use of depth charges by surface craft acting in co-operation were a problem which called urgently for solution. Experiments gradually yielded results, and before the war was over the U-boats had learned to fear the seaplane as their most deadly foe.

For the rest, progress was made in the early years of the war in bomb attack by means of an efficient dropping gear; in the effective use of small-bore fire-arms against attack by Zeppelins, especially by the invention of the tracer bullet, and in the mounting of machine-guns on aeroplanes.

The Ger. Army at the outbreak of war possessed twelve rigid airships and were constructing others. The skill and *élan* of their flying officers were well known from observers at manœuvres. Their airship engines were of 200 h.p. and more, and were capable of modification for use in aeroplanes. Probably Great Britain had the fastest machines in Europe, but pre-occupation with reconnaissance handicapped the British Service in other directions, so that for a time both the Ger. and Fr. armies were more adequately equipped for aerial warfare than the small British Expeditionary Force. Early in the war, however, the British machines rendered the most essential service. Numerous reconnaissances during the Great Retreat (August 1914) gave Sir John French accurate information on the location of the enemy and of his batteries. The Great Retreat also saw the beginnings of fighting in the air as distinct from reconnaissance and artillery-fire direction, five Ger. machines being destroyed during the retreat by the men of the Royal Flying Corps. About this time an important change in organisation was made by the decentralisation of the Royal Flying Corps, so that certain squadrons were attached to the Corps commands. This experiment, which followed the Ger. organisation, saved time by enabling observers to report direct to the corps to which they were assigned instead of going back to their own centre.

Photography. In these early months of the war the British Naval Air Service, apart from patrol work in home waters, took effective measures against Ger. Zeppelins by organising Dunkirk as a base for attack by seaplanes, operating with sixty armed motor-cars for raids on the flank of the German communications. The object of this move was to deny the use of territory within 100 miles of Dunkirk by Ger. airships, and its effect was undoubtedly to restore the morale of the inhabitants. Late in 1914 a squadron of four Avros with 80 h.p. engines carried out an attack on Friedrichshafen (November 21). Three machines reached this airship

factory and wrought havoc on the works, a Zeppelin, together with the gas-works, being destroyed. There were also other raids into Ger. territory before the year was ended (*see also* AIR RAIDS).

In the Ger. Army the pressure of duties on so extended a front made it impossible to do much more than reconnaissance work, although its flying force was very large. Its most active machines were the single-seater scouts and, later, the 'trench-strafing' machines. The precursors of these latter were the escort squadrons originally established for the protection of 'working machines.' The function of the escort was to ward off attack from the 'working machines,' which were carrying out patrols or observations. The 'trench-strafing' machines flew by day over Fr. and Eng. trenches, dropping bombs, and then, at night, flew behind the lines to damage billets, stations and other objectives. Often the same men who flew by day went out on these night raids, so great was the strain on Ger. resources, especially in 1917 and 1918. The principal duty of the artillery observation machines in the 1917 operations consisted in relieving the pressure upon the infantry by subduing the Allied artillery (Aisne-Champagne front). In every group certain machines were told off to undertake fire control for Ger. long-range guns. Bombing squadrons came under the direction of the Army Groups, and were used against depots, camps, and other traffic centres. It was admitted by the Ger. that the aerial strength of the Allies was numerically the superior in many important battles. In many instances it is recorded by the Ger. war diaries that aerial battles were not pursued so determinedly on Fr. as on the British front, the Fr., although gallant, being less keen. Long combats, such as were common on the Eng. front, were the exception on the Fr. Perhaps the most doughty Ger. flyers were the men in Capt. Richthofen's squadrons, who became known as 'Richthofen's Circus.' Another famous squadron was the Lafayette Escadrille of the French Army made up almost entirely of rich roung Americans who joined the orces before America came into the var. Duels in the air became very ommon in the later years of the war. he term 'ace' became the accepted tle of a Fr. airman who had 'bagged' certain number of enemy machines. : the last two years of the war all e duties enumerated in this article d come to be performed by all the ing forces on either side and A. W. l reached, under the stress of war, a pitch of development which h the war had hardly been dream One of the most notable Br airmen heroes in the war was Cap Albert Ball (*q.v.*), whose Nieu machine 'came quickly to be fea by enemy pilots and may be said have been the spearhead of achievements of the Royal Fly Corps over the Somme' (*Offic History of the War*, Vol. II). Anoth was Lieut. G. R. McCubbin, wh in 1916, with a second Briti airman, attacked three Germa Fokkers over Annay, sending dow one in flames, which proved to b that of Max Immelmann, who wa then the leading German fightin pilot. Major James Byford Mc Cudden, who joined the Corps as a mechanic, also won a great reputation, winning the V.C. and bringing down in all over fifty German machines on the Western front. Others were Lieut. W. B. Rhodes-Moorhouse, V.C., a pioneer of flying in England, who won his decoration for dropping a 100-lb. bomb on the railway line west of Courtrai station in 1915; Captain L. G. Hawker, V.C., who won his decoration for gallantry in attacking three German machines over Hooge in 1915; Lieut R. A. J. Warneford of the R.N.A.S., who brought a Zeppelin down in flames near Bruges; and Captain Leefe Robinson, V.C., who performed a similar feat near Cuffley, Middlesex, England. Canadian airmen took a prominent part in the work both of the R.F.C. and of the R.N.A.S., their adaptability and initiative making a special appeal to the British authorities. The most redoubtable of Canadian fighting pilots was Capt. W. A. Bishop (*q.v.*), who up to 1917 accounted for no fewer than 72 German machines. Another was Lieut. A. A. McLeod, who won the V.C. for bravery in attacking eight German triplanes, shooting three of them out of control. [Consult *The War in the Air* by Walter Raleigh (1922); *The German Air Force in the Great War*, by Major Georg Neumann (1920).]

Aerochinoscope, a species of semaphore for publicly signalling changes in barometric readings.

Aerodynamics. The science of A. consists of the study of the forces which air can exert on a body, due either to the motion of the body through the air or to the motion of the air past the body. It finds its most important application in the design and construction of aircraft, and the word A. is now generally used to refer to the mechanics of flight. In this sense the subject deals with: (*a*) the origin and nature

of the air forces experienced by an aircraft, and (*b*) the effect of these forces on the behaviour of the aircraft. A knowledge of A. is therefore essential for the determination of such important items as the strength of the structure, the capability of the aircraft to carry its load, and the degree of stability and controllability.

In so far as A. deals with (*a*) above, it cannot be regarded as an exact science, for many of the air forces acting on an aircraft are not directly calculable from first principles, but have to be determined by experiment. Most of the experimental work is carried out on models, and in this work advantage is taken of the fact that the air forces are the same, whether the model is moving through still air, or the model is stationary and the air is flowing past it, provided that the relative speed is the same in each case. The model is therefore kept at rest and mounted in a long box of circular or square cross-section, called a wind channel or wind tunnel, and the air is driven through the channel by the action of a propeller or an airscrew driven by an electric motor. In this way the air forces can be simply and accurately measured.

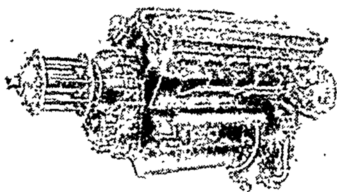
The fundamental law of A. states that, for all geometrically similar bodies inclined at the same angle to the airstream, the air force experienced may be taken with good accuracy to be directly proportional to the density of the air, the square of some linear dimension, and the square of the speed; and it is by the use of this law that data obtained from model experiments can be applied to the full-scale aircraft. Suppose, for instance, the full-scale resistance at 100 miles per hour is to be deduced from the measured resistance of a $\frac{1}{10}$ scale model at 50 miles per hour, the air density being the same in each case. Then, since every dimension of the full-scale aircraft is ten times the corresponding dimension of the model, the measured resistance must be multiplied by 10^2 or 100 to allow for scale. Again, since the full-scale speed is double the model speed, the measured resistance must also be multiplied by 2^2 or 4. Thus the full-scale resistance at 100 miles per hour is 400 times that of the model at 50 miles per hour.

Near the ground density variation is negligible, but the decrease of density at height is most important. For instance, the density at 22,000 feet is only one-half that at ground level, and so the resistance at this height is halved also. It might be thought from this that aeroplane performance is better at height than near the ground, whereas, in point of fact, exactly the reverse is the case, owing to the introduction of several other factors, the primary one of which being the loss of engine power due to the density reduction.

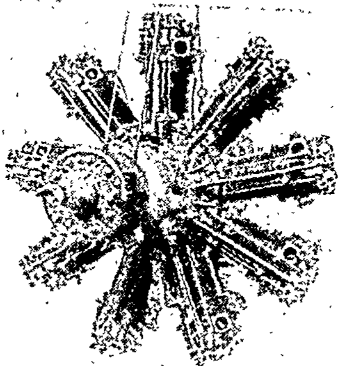
Although A. still depends to a great extent upon experiment, the mathematical theory of airflow has not been neglected, and modern research has thrown considerable light on the true working conditions of such important aircraft components as airscrews and aeroplane wings. Applied A. is now, in fact, a blend of theory and experiment, and it is possible to predict most air forces with considerable accuracy. Clearly, when all the air forces on an aircraft are known, aerodynamics fulfils its function with regard to (*b*) above by the application of the more exact principles of ordinary mechanics. (*See also* PNEUMATICS.)

Aero Engines. Flight by man was made possible by the introduction of the light, high-speed petrol engine, and the subsequent development of aircraft has coincided with the perfection of this prime mover. A.E. may be divided into three main groups, viz. rotary, radial, and Vee-type engines. In the first group the cylinders are arranged radially round a single fixed crank, about which they rotate, the fuel being fed into the crankcase through a pipe running up the centre of the hollow crankshaft. This type of engine is quite satisfactory up to about 200 h.p., but, owing to the gyroscopic effect of the large rotating weight of the cylinders and losses due to windage, it is gradually passing out of use. Engines of this class are the Gnome, the Rhone, and Bentley. Radial A.E. also have their cylinders arranged like a star round the crankshaft, but in this group the cylinders are stationary and the shaft rotates. Engines of this type are all air-cooled, which leads to reduction of weight and simplicity, and the cylinders are arranged in either one or two rings, each ring containing an odd number of cylinders, *e.g.* 5, 7, or 9. In spite of one or two disadvantages, this design is becoming increasingly popular, owing to the efficiency with which the cylinders may be cooled, its ease of attachment to the fuselage of an aeroplane, and because of the extra space available for other purposes due to the smallness of its dimensions from front to rear. As typical examples may be quoted the Bristol 'Jupiter,' which develops about 440 h.p. from a single ring of nine cylinders; the Armstrong Siddeley 'Jaguar,' whose fourteen cylinders arranged in a double ring give 460

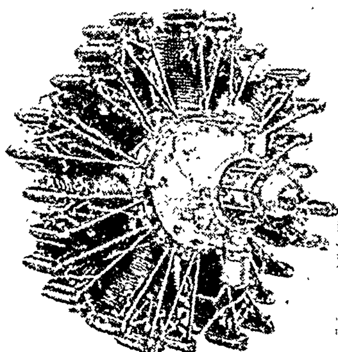
h.p., as well as smaller engines of seven and five cylinders. Many engines which have made history by their remarkable performances belong to the Vee-type of engine, which here will be taken to include the plain straight-line six- and eight-cylinder engines. The name 'Vee' is given development of the Vee is the arrow or fan type, where there are three banks arranged like an arrow-head. Such an arrangement of cylinders produces a very short engine, and it is claimed that for this reason the crankshaft is much stiffer, and consequently there is a minimum of



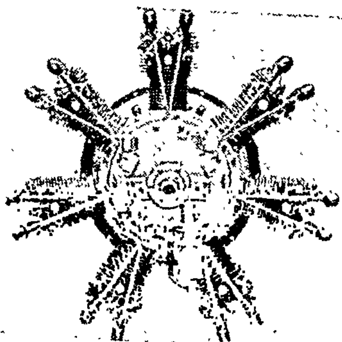
Rolls Royce 'F' type



Bristol 'Jupiter'



Armstrong-Siddeley 'Jaguar'



Armstrong-Siddeley 'Lynx'

AERO ENGINES

(Photographs by courtesy of the makers)

because the cylinders are arranged in two rows in such a manner that if viewed from the end they form the letter V. The cylinder cooling for this class is by means of a water-jacket. It is characteristic of these engines that two pistons—one from each bank of cylinders—are connected by their connecting-rods to a single crank. Thus a twelve-cylinder engine will have only six cranks. Such an engine is the 500-h.p. Rolls Royce 'F,' which has twelve cylinders arranged in two rows of six each. A vibration. This is the construction of the Napier 'Lion.'

For the light aeroplane, such as the 'Moth,' small engines having four water-cooled cylinders in line are almost invariably used, and owing to their extreme simplicity are unlikely to be displaced. Designers are endeavouring to produce an engine operating on the Diesel cycle, which will have a sufficiently high rotative speed, to be used in aircraft. The chief problem in this case is one of weight, but undoubtedly this will be

eventually overcome by the use of special metal alloys. Such an engine has a higher efficiency than is possible with petrol engines and, using as it does a heavy, less volatile fuel, the liability to cause a fire is reduced. The engines of the British Airship R101 were of this class.

An important feature of the A.E. is its weight-power ratio, because the lower this figure the greater will be the useful load-carrying capacity of the aeroplane in which the engine is installed. Before the Great War the aircraft engines in use in this country had a weight of about 5 lb. per h.p.; to-day this ratio has been reduced in the special racing Napier Lion, which engined the winning plane in the 1927 Schneider Trophy, to 0·944 lb. per h.p. A general figure for all modern A.E. is under 2 lb.

As one ascends from the earth's surface the density of the atmosphere is reduced; at 10,000 ft. the density has been reduced by about 30 per cent. This would have the effect of causing an over-rich mixture of fuel and air to be supplied to the engine, with a corresponding falling-off in power after a certain point; as well as a reduction in efficiency. The effect of altitude upon the performance of an aero-engine is counteracted in either of the following ways: (*a*) by fitting an altitude control to the carburettor, or (*b*) by supercharging. The altitude control is a device which enables the pilot as he climbs, to reduce the amount of petrol issuing from the carburettor jets, with the result that a 'correct' mixture of about 15 lbs. of air to 1 lb. of fuel is always supplied. Though this method maintains a constant mixture-strength, owing to the weight of fuel being reduced, the power is also lowered. Supercharging is the only method of ensuring full power under all conditions. It consists of delivering the combustible mixture to the cylinders at, or slightly above, normal atmospheric pressure by means of a rotary-blower driven either directly by the engine or by a turbine operated by the exhaust gases.

Aerolite, a mass of stony or metallic matter known to have fallen to the surface of the earth from beyond the region of the atmosphere. Sometimes a distinction is drawn between As. and meteorites, the latter being taken as the generic term and the former applied to those masses which are composed of stony matter only. Other meteorites contain a large proportion of metallic iron alloyed with nickel; these, however, are comparatively rare occurrences.

At different periods during the year, particularly in the month of November, showers of 'shooting stars' or meteors are to be observed. They consist of planetary bodies which have come within the earth's gravitational influence, and are heated to incandescence by friction with the earth's atmosphere. They may be divided into two classes, 'shooting stars' and 'fireballs.' The former usually appear as bright streaks rapidly drawn across the sky, and gradually fading away; the latter are distinguished by a greater radiance and a slower motion. They are sometimes accompanied by loud detonations, and as stones have been sometimes seen to fall soon afterwards, it appears that 'fireballs' are meteors that actually reach the earth, or at any rate arrive to within a short distance of it.

It is estimated that meteors enter the atmosphere with a velocity up to 50 m. per second. In most cases the substance is dissipated before the body reaches the ground; if it survives to the lower and denser parts of the atmosphere, the velocity is considerably reduced, thus meteorites examined shortly after their fall are found to possess no very high temp. In appearance they are irregularly-shaped fragments covered with a crust or glaze, which is the result of their previous incandescence. They consist of substances which are to be found in the earth's crust, and at least two-thirds of the earth's elements are represented. No trace of organic matter has been discovered, so that they throw no light on the problem of the existence of life in the rest of the planetary system.

Meteors were naturally superstitiously regarded by the ancts., and the stones were venerated as visitants from heaven. 'Diana of the Ephesians,' which fell from Jupiter, was probably a conical A.

Masses of meteoric stone have been found which weigh as much as 50 tons, but the largest actually seen to fall came down in Hungary in 1866 and weighed 547 lb. A collection of As. may be seen at the Natural History Museum in South Kensington.

Aeronautics. This science may be divided into two parts, aerostation, that is, flight by means of something lighter than the air; secondly, aviation, that is, artificial flight, either by means of machines, or else as birds by means of artificial wings. Historically, aviation is the older of the two, since, if we go back to mythology, we find the stories of Pegasus and later of Dædalus. Further, the monsters of Assyrian and Egyptian mythology give us examples of beasts that were supposed to be able to fly. During the

middle ages and down until the beginning of the eighteenth century we get story after story of men fitted with artificial wings, either making or attempting to make flights. We have, for example, the story given us by a Scotch poet, of how an Italian magician gave an exhibition of flying for the edification of James IV. He purposed to fly from the walls of Stirling Castle, armed with wings which were composed chiefly of birds' feathers. Naturally he failed, being fortunate enough to escape with only a broken thigh. his explanation of his failure apparently being that his wings were not made of eagles' feathers, but of some of the lesser birds of the sky. We have further references to the art of flying in Leonardo da Vinci and in Roger Bacon, and later still we find an attempt to prove that flight by means of man's own strength was impossible, this being argued chiefly from a detailed examination of the muscular strength of birds. The first science, however, to be more or less successful was aerostation. In the classics we get one reference which gives us an idea that the later method of aerostation by means of hot air was known to the ancients, this reference being to the flying dove of Achytas, but for a further development of this method we have to come down to mediæval times. Roger Bacon (1214–94) speaks of attempting by means of a hollow globe and liquid fire to solve the problem, while in the following century he is followed by Albert of Saxony (1366–90), who also spoke of aerostation by means of fire in a light sphere. During the sixteenth and seventeenth centuries, however, we get a number of fantastic ideas put forward. Laurus, for example, spoke of swans' eggs filled with sulphur or mercury being drawn up o the sun, while in the adventures of Cyrano de Bergerac vessels filled vith morning dew are supposed to ave carried a man into the middle of he atmosphere. But also in the sixeenth century we get the beginning much better ideas. Francis Lana me forward with an idea which, ough practically unserviceable, was vertheless a great advance on evious ideas. He proposed that four llow balls should be taken, made brass of the very slightest thicks, and that these should be exsted of air. To them should be ached a small boat and sail, and in way a balloon would be contrived ch could carry a man. The idea not feasible, since the globes, e only of brass 1-250th of an in. , would have collapsed by reason eir own weight. But although , saw this difficulty, he argued that their shape would preve that. It was not until the ne century that we get the real balloo invented.

The beginning of the developmen of the balloon was the work of two brothers, Joseph and Etienne Montgolfier, who were the sons of a paper manufacturer of Annonay. They seem to have been influenced by Cavendish's experiments relating to the weight of hydrogen, and by Priestley's paper on 'Different Kinds of Air.' From their own observation of the clouds they came to the conclusion that a paper bag filled with 'substance of a cloud-like nature' would float in the atmosphere. They experimented with paper bags over fires and found that they floated. This determined them to have a public exhibition at Annonay. On June 5, 1783, they inflated a bag, made probably of linen, though some authorities say that it was made of paper, over a fire of chopped straw. This balloon rose to the height of about 1½ m. before it cooled sufficiently to descend about ten minutes after its ascent. The Montgolfiers, however, came to the conclusion that the ascent was due to the smoke of the fire, and did not realise that it was really due to the lightness of the heated air. This experiment attracted much attention, and steps were taken for the sending up of a hydrogen balloon in Paris. The prime movers in this were M. Faujas de Saint Fond, M. Charles, and two brothers named Robert. The balloon was filled with hydrogen made by the action of 500 lb. of sulphuric acid on half a ton of iron filings, and took four days to inflate. The balloon was about 13 ft. in diameter, and weighed less than 20 lb. The balloon, when liberated, rose to the height of about 3000 ft. and remained in the air for about three-quarters of an hour, and then descended in a field at Gonesse, where it was torn to pieces by a terrified and infuriated French peasantry. The two types of balloons have usually been differentiated as air balloons and fire balloons, or Robertières and Montgolfières. Following this experiment came another by Montgolfier, who sent up a balloon from Versailles carrying a sheep, a duck, and a cock. These animals descended, safely about eight minutes after the ascent, the only injury being to the cock, who was trampled upon by the sheep, although this probably occurred before the ascent. The first man-carrying ascent took place in Oct. 1783, when Pilatre de Rozier went up in a Montgolfier captive balloon, the inflation again taking place by means of fires of chopped

straw which were carried in a brazier suspended under the balloon. In Nov. of the same year the first free ascent was made by Rozier and the Marquis d'Arlandes, who made an ascent in a fire balloon. They journeyed about 5 m. at a height of about 500 ft., descending safely in a field just outside Paris. In Nov. there seems to have been made the first man-carrying ascent with a hydrogen balloon at Philadelphia, seven days after the ascent of Rozier and D'Arlandes at Paris. Longheed says that a carpenter named James Willcox allowed himself to be persuaded to make the ascent, which was under the auspices of the Philosophical Academy. In Dec. Charles and Robert made an ascent in a free hydrogen balloon of about 27 ft. diam. They safely accomplished a journey of about 27 m. in just under two hours, when, Robert having got out, Charles made a further journey of about 3 m., rising to the height of about 2 m. and enduring some discomfort from the rapid ascent and the height to which he was carried. To Charles is due the credit for the ideas of a valve and a car suspended from a hoop attached to the balloon by means of silk netting. The first woman to ascend was Madame Thible, who went up from Lyons in 1784.

The development of the hydrogen balloon, however, was due also to the experiments which had already been made by Cavendish, who showed the lightness of hydrogen as compared with the air, and the work of Dr. Black and Tiberius Cavallo. Dr. Black had attempted to cause a calfgut bladder to ascend when inflated with hydrogen, but had failed because of the heaviness of the calfgut, but Tiberius Cavallo had inflated soap bubbles with hydrogen and floated them in the year previous to the first ascents by Montgolfier (1782). The first ascent in Great Britain took place about five months after the first Montgolfier ascent in France; the balloon was made by a certain Count Zambeccari, being about 10 ft. in diameter and weighing 11 lb. It went up from the artillery ground in Nov. 1783, and descended about 48 m. from London in Sussex, having been in the air about 2½ hours. At the beginning of the next year (Feb. 1784) a balloon was liberated from Sandwich, and descended in French Flanders; this was the first cross-Channel flight. The real introduction of aerostation into England, however, was made by Lunardi. He was secretary to the Neapolitan ambas., and in his letters gives a detailed description of the circumstances attending his first flight. His balloon was 33 ft. in diameter, and was visited by about 20,000 people during the time that it was on view at the Lyceum in the Strand. On Sept. 15, 1784, he made an ascent from the artillery ground by himself. A huge concourse of spectators, amongst whom was the Prince of Wales, watched the ascent. Lunardi took with him a dog, a cat, and a pigeon, and his balloon was fitted with oars by which he intended to try to navigate the balloon. One of the oars, however, broke shortly after the beginning of the ascent. He landed first of all at a village in Hertfordshire after about 1½ hours' travelling, and again continued his journey to Standon near Ware, which he reached after about a further ¾ hour's flight. This was the first real ascent in Britain, and attracted an enormous amount of attention. Lunardi became the lion of the moment, he was presented at court, and was received everywhere with extravagant enthusiasm. He made further ascents in Scotland in the following year, during one of which he travelled about 110 m. The first man-carrying cross-Channel voyage was made by Blanchard and Jeffries in Jan. 1785. Blanchard had already in the previous year estab. a reputation as an aeronaut, and by this and succeeding voyages he became known as one of the most famous of aeronauts. The cross-Channel voyage was accompanied by some perils, but was safely negotiated, the descent being made in the forest of Guinnes. In the same year another attempt was made to perform this same feat by Rozier and Romain. The balloon used on this occasion was a combination of a Montgolfière and a Robertière. The actual ascent was made in safety, but the balloon having risen burst into flames, and the aeronauts were both killed. During the century which followed balloons were greatly developed, and were used for scientific and military purposes. Long voyages were undertaken and immense balloons were constructed for the purpose of carrying out various projects—the great Nassau balloon journey in 1836 from London to Weilburg, a distance of nearly 500 m., in about 18 hours. In 1863 Nadar constructed what was called 'Le Géant,' a very ambitious vessel, which was constructed for the purpose of making long voyages. The car of this balloon was exhibited at the Crystal Palace during the years 1863–64.

During the nineteenth century a number of long voyages were either made or contemplated, the two longest made being voyages of over 1000 m.

in 1859 in America, and in 1900 from Paris to Korosticheff, a distance of 1193 m. In 1897 an attempt was made to discover the N. Pole from Spitzbergen by balloon, but Andrée and his two companions perished, no traces of them being found until over thirty years later. (See ANDRÉE.)

The development of the balloon soon brought with it the possibility of scientific research, and various experiments were made during the early part of the nineteenth century. Most of the experiments were not at first carried out very carefully, and the results did not come up to expectations. Two ascents by the scientist Gay-Lussac, however, gave some useful information regarding the upper air and the effect, or rather lack of effect, of the upper air on magnetic force. After 1805 the experiments seem to have ceased until the middle of the century. Between 1850 and the end of the century a number of important ascents were made for scientific purposes; the most important of these were the ascents made by Glaisher between 1862–66. Altogether twenty-eight ascents were made, a number being made from Wolverhampton and from Woolwich. The chief problems that these ascents tried to solve were, the height, density, and thickness of clouds, the direction and the rate of the various air currents, the amount of electricity in the air, and the comparison of readings of an aneroid barometer with those of the mercury barometer. The results of the observations were pub. in the British Association Reports between 1862–66. A number of extremely high ascents have been made, but these have always been attended with much danger. The highest was made in July 1901, when a height of some distance over 34,500 ft. was reached by two aeronauts from Berlin. To obviate the necessity of making these dangerous high ascents, unmanned balloons have been sent up with recording instruments attached that work automatically.

Although it is only from about 1885 at balloon corps were organised by e armies of the various great powers, evious to that time they played an portant part in the various camigns of Europe. From the beging they had attracted the attention the military authorities, and we r of their being used during the s which followed the French Revoon. In June 1794 balloons were d for the purpose of reconnoitring the Fr., who were fighting the trians, but the idea was not usly developed, and in fact the oning corps of the Fr. were dised by Napoleon. But war balloons were used by the Fr. whe fighting in Italy, but were at thi period in charge of two civil aeronauts there being no ballooning corps. In the American Civil War, at leasт during the beginning of that war, they proved themselves of very considerable value, in fact a small Federal balloon corps was formed during this period. During the siege of Paris they proved of great use in keeping up communications with the outside world, and sixty-four of them were dispatched between the beginning and end of the siege.

Dirigible balloons.—From the time of the beginning of balloon flights it was recognised that the great problem before aeronauts was to be able to navigate the balloon safely through the air, and to make it to a very great extent independent of the air currents. The first means of propulsion tried was oars, but although in a calm atmosphere some little success was gained with them, it was recognised that this means could never be really successful. Oars were experimented with at the end of the eighteenth century, but the first attempt to navigate the balloon by means of a small, light engine came over fifty years later, in 1852, the experiment being made by Henri Giffard. Between that time and the end of the century many experiments were made, some of which attained a transient success, some met with almost instantaneous disaster. In 1897 an experiment b Dr. Wolfert with a small gasolin motor led to the explosion of the air ship in mid-air and to the death of the aeronauts. From the year 1897 the development of the airship was the special work of the Count Zeppelin. In 1900 he made his first flight with a dirigible balloon which carried five men. It was made of aluminium, supported by gas-bags and driven by two motors, each about 16 h.p. His first experiment met with some success, but the first Zeppelin airship was succeeded by another in 1905 with greater motor power; this was wrecked and was succeeded by a third, which met with great success. This airship carried eleven passengers and attained a speed of about 36 m. an hour. The fourth Zeppelin airship succeeded in travelling about 250 m. in 11 hours, but was wrecked by a storm in 1908, the wreckage catching fire and completely destroying the ship. In the meantime many other experiments had been carried out, notably by Santos Dumont, who circled the Eiffel Tower in the face of a fresh wind; while in England a number of experiments were carried out by the War Office with dirigible balloons. The most successful voy-

age was that of the 'Nulli Secundus,' which, leaving Farnborough, sailed round St. Paul's to the Crystal Palace, carrying two passengers and attaining a speed of about 20 m. an hour. (*See also* AIRSHIPS.)

The study of artificial flight can be traced back practically through legendary story to the beginnings of history. As has already been pointed out, the history of aviation is older than aerostation, and during the middle ages we get many attempts to put forward a workable airship or to imitate the flight of birds by means of artificial wings. Leonardo da Vinci put forward theories concerning flight, and during the latter part of the seventeenth century and the beginning of the eighteenth we get many theories put forward and much research made concerning the theory of flight. Much experiment was done with artificial wings and with aerial screws. Amongst the names which may be mentioned in this connection are those of Bonelli, Morey, Pettigrew, and Cayley. To Sir George Cayley is given the credit of being the inventor of the modern aeroplane. Professor Berfet in his book *The Conquest of the Air* points out every essential to successful flight was given in the airship invented by Sir George Cayley. 'In fact everything was there in Sir George Cayley's idea—the wings forming an oblique sail, the empennage, the spindle forms to diminish resistance, the screw propeller, the explosion motor, the calculation of the centre of thrust, and the demonstration of the fact that displacement takes place towards the front. The author even describes a means of securing automatic stability.' This machine was described by Sir George Cayley in a paper contributed to *Nicholson's Journal* in 1809, and in the following year he produced the apparatus itself—at first without a motor, but later with a motor as well. The invention, however, was not successful, and during the trials the machine met with disaster. The next attempt at aviation that we hear of is in 1843, when Hensons, by a combination of aerial screws and supporting surface, tried to complete a successful machine. The attempt was not a success, although it was followed up in the succeeding years by many other attempts, especially by his partner, Stringfellow. During the years which followed many attempts to solve the problem of aerial flight were made, but none of them met with great success. The difficulties in the way were enormous; the science of aerodynamics had yet to be developed; flight in the air was flight through a substance, the laws of which were only dimly beginning to be understood. The science of aerodynamics, which even now is only at its beginning, was developed during the latter part of the nineteenth century by Sir Hiram Maxim, and Prof. Langley, an American physicist. By 1896 the experiments of Langley had been so far successful that he made an aeroplane which, although it did not by its own effort lift itself from the ground, flew for a distance of about half a mile along the Potomac R. Further experiments had in the meantime been carried out by Sir Hiram Maxim and N. C. Ader. The former to a very great extent helped to solve the problem of light motors by producing in 1894 an aeroplane with an engine which weighed not quite 2 lb. per 1 h.p. But in spite of this the aeroplane failed to fly. Ader seems to have been the first inventor to produce a machine which lifted itself from the earth by its own effort. Between 1896–1903 he produced three machines, none of which were very successful, but which embodied new ideas, and one of which flew for about 350 yds. The first aeroplane flight may be said to have taken place at Satory in 1896, when Ader's machine lifted itself by its own power and flew for the short distance already mentioned. In the meantime experiments were being made with soaring machines and gliders. The chief name to be mentioned in connection with this movement is that of the Berlin engineer, Otto Lilienthal, who, with an arrangement formed on the plan of birds' wings, attempted to imitate their 'soaring flight.' These wings were made of a light framework covered with a light fabric with two rudders in the rear. In the centre of this framework Lilienthal was poised, and with an apparatus of this description he made over 2000 flights in safety. He met his doom while using a biplane glider, falling from a height of about 80 metres and breaking his neck. These experiments were further carried out by Chanute in New York, he introduced several new ideas. The experiments were also continued at the beginning of the present century by the brothers Wright. These two young Americans, Orville and Wilbur, were originally cycle makers of Dayton, Ohio. They followed up the ideas which had already been promulgated by Lilienthal and Chanute. The result of these experiments was that in 1903 the brothers Wright produced their first aeroplane. The first invention of the Wrights was simply an aeroplane that flew in a straight line, but this received many modifications, and in 1908 they came to France to carry

on experiments there. So much mystery had surrounded them, and so many canards had been spread concerning them, that their successful flights came to the many as a great surprise. During the experiments Wilbur Wright created a record by remaining in the air for over an hour while carrying a passenger. He also attained a speed of 60 kilometres an hour. During this period, however, great strides had been made by many other inventors. Farman had succeeded in producing a machine with which he remained in the air for nearly forty-five minutes, and he was closely followed, and sometimes surpassed, by the Frenchman Léon Delagrange. The best results, however, were undoubtedly attained by the brothers Wright, who succeeded in remaining in the air for nearly 2½ *hours*. The year *1909* may be taken as the real era of the beginning of successful aviation. In that year records were made only to be broken, and the ultimate success of the monoplane and biplane was proved by many successful experiments. On July 25, 1909, Bleriot flew the Channel on a *monoplane*, but in the same year Farman covered a distance of nearly 140 m. in four hours on a biplane. Between 1890 and 1908 the best distances flown were 164 ft. by Clement Ader in France in 1890, 852 ft. in 1903, 20¾ m. in 1905 and 50 m. 1638 yds. in 1908, all by Orville Wright in the U.S.A.

Compared with the Great War period and after, progress was relatively slow in the five years preceding the war. Up to that time the chief international records were: *duration*, 24 hrs. 10 mins. by Boehm (Ger.) in an Albatros biplane, 1914; *distance* (over circuit without alighting) 1200 m. by Landmann (Ger.) in an Alba- [illegible] *altitude*, 25,750 ft. by Oelrich (Ger.) in a D.F.W. biplane, 1914; *speed*, 126·59 m.ph., by Prevost (Fr.) in a Deperdussin monoplane, 1913. Passenger-carrying records were: *duration*, 19 hrs. 47 mins., 9 passengers, pilot Noel (Fr.) in Graham-White biplane, 1914; *distance*, 68·3 m., 6 passengers, pilot Garaix (Fr.) in Schmitt biplane, 1914; *altitude*, 980 ft., 15 passengers, pilot Sykorsky (Russian) in Sykorsky biplane, 1914; *speed*, 66.85 m.p.h., 6 passengers, pilot Garaix, in Schmitt biplane, 1914; *flying over sea*, 320 m., Cruden Bay (Scotland) to Kleppe (Norway), pilot Gran (Norwegian) in Bleriot monoplane, 1914. Garros in Sept. 1913 flew 700 m. across the Mediterranean, but passed over Sardinia en route.* Among the best British flights of those years were 107 m. 1320 yds. in 3 hrs. 12 mins. 40 secs. by T. Sopwith and 185 m. 810 yds. in 4 hrs. 47 mins. by S. F. Cody, both in 1910. These pioneer records, if valuable, look unimpressive to-day. It was the Great War (*see also* AERIAL WARFARE) which gave so great an impetus to A. in all its branches, and if progress during that period was hastened by and directed along the lines of military necessity, it enured to the ultimate benefit of aviation generally.

The transition of both heavier-than-air machines and dirigibles from the experimental stage to the practical, judged by the low percentage of accidents as compared with other modes of transport, by the immense distances flown without a stop, and by the regular use of air routes involving the carriage of over 30,000 passengers (in British aircraft) annually over a total distance of more than 1,000,000 m., is well-nigh complete. A further indication of the progress made is afforded by the existence of national and international laws for the regulation of civil aviation, the creation of Air Ministries, and the establishment of aerodromes in all countries of any real importance. The increasing reliability of heavier-than-air machines is shown by the long distance and spectacular flights of the past ten years. The most remarkable oceanic flight was the lone venture of Capt. (now Col.) Chas. E. Lindbergh, of U.S.A., in crossing the Atlantic (*see* ATLANTIC FLIGHTS), who, since that epoch-making effort, has carried out a series of flights over Central and S. America and the West Indies, covering 40,000 m. during 460 hrs. with only one motor. He expressed the view on that occasion that a modern plane and engine, in the best conditions of maintenance and use, should last at least 150,000 m. His celebrated machine, the *Spirit of St. Louis*, is now deposited in the Smithsonian Institution, and the awards made to him include the Congressional Medal of Honour, the Woodrow Wilson Peace Award, the Internat. Aeronaut. Federation's gold medal, and the Harmon trophy of the Internat. League of Aviators. Another notable flight was that of Capt. Herbert John Hinkler, of Australia, who in 1928 in a light Avro Avian machine flew from Croydon, England, to Port Darwin, Australia, a distance of 12,000 m. in 16 days, at an average of 95 m.p.h., stopping at Rome, Malta, Basra, Cawnpore, and other large towns at intervals of between 400 and 900 m., but in Oct. 1930

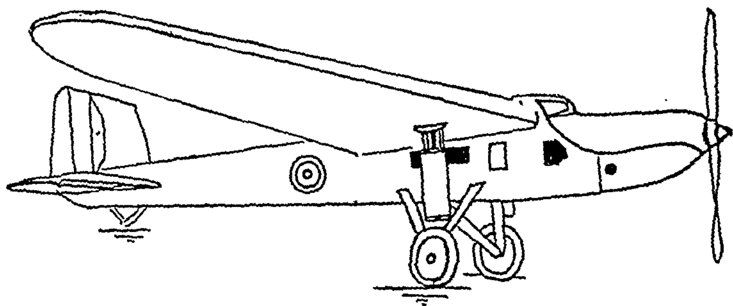
Wing-Commander (previously Captain) Kingsford-Smith accomplished the same journey in about ten days. In May 1930 Miss Amy Johnson, a 26-year-old Englishwoman, flying a *Gipsy Moth*, set up a new record for a solo flight from London to India. Continuing her journey, she reached Port Darwin, Australia, in 19 days, having covered in all about 10,000 m. She reached Karachi in 6 days, averaging 700 m. a day and covering 4140 m. It is noteworthy that the flier had previously but slight experience of long-distance flying or of navigation in unfamiliar areas; she was, however, the first woman to receive an Air Ministry certificate as a ground engineer, and her skill in repair work stood her in good stead during her long flight, especially after reaching Burma, when she met with mishaps through storms. The machine was fitted with extra petrol tanks for long-distance work. In addition to the 19-gall. centre section tank, it had a 35-gall. tank in the front cock-pit and a 25-gall. tank in the fuselage behind the pilot's cockpit. This extra provision gave the machine a capacity of 79 galls., which, at the normal cruising speed of 65–80 m.p.h., according to height, gave it the range of 1100–1300 m. as compared with the 260–320 m. with the usual 19-gall. tank of the *Moth*. A successful trans-Pacific journey was that of Capt. C. J. Kingsford-Smith, pilot, Capt. C. T. Ulm, relief pilot, both Australians, with Harry W. Lyon, navigator, and J. Warner, radio-operator, both of U.S.A., in the *Southern Cross*, a triple-motor Fokker monoplane. They flew from California to Honolulu, Fiji, and on to Melbourne, a distance of 7800 m., in 3 days 16 hrs., the features of the flight being accuracy of navigation and continuity of wireless communication. In Polar regions, Capt. Hubert Wilkins, the explorer, flew from Alaska to Spitzbergen (20,000 m.) in a monoplane with a wasp engine, to demonstrate the superiority of the plane over the dirigible for Arctic flights. In 1926 Rear-Admiral Byrd, U.S. Navy, accompanied by Pilot Floyd Bennett, flew from King's Bay, Amsterdam Island, direct to the North Pole, and back to his starting point; a total distance of 1600 m. in under 16 hours. He has also flown over the South Pole. (*See also* AIRSHIPS: ARCTIC EXPLORATION). Other remarkable long-distance flights were, those of Sir Alan Cobham in 1925–26 from England to Cape Town and back (16,000 m.) and in 1926 to Australia and back (28,000 m.); a non-stop flight in 1929 from England to India (4130 m.) by Sqdn.-Ldr. A. G. Jones-Williams and Fl.-Lt. N. H. Jenkins, in an R.A.F. monoplane, taking 50 hrs. 38 mins.; by Capt. C. D. Barnard, Robt. Little; the Duchess of Bedford, in 1929, from Lympne to Karachi and back to Croydon in 7½ days; and R. F. Caspareuthus, of S. Africa, from London to Cape Town in about 8½ days, in 1930. The Schneider Trophy contest, the risks attendant on which have invited the severest criticism and caused most Governments to abstain from sending representatives, has produced speed records of over 300 m.p.h., viz. 318·62, at Venice, on March 30, 1928, by Major Mario de Bernardi; 328·63 m.p.h., over the Solent on Sept. 7, 1929, by Fl.-Offcr. Waghorn (R.A.F.), 284 m.p.h., being on that occasion the speed of the runner-up, Dal Molin of Italy (Fl.-Off. Atcherley, R.A.F., would have been second but for miscalculating a turn in the laps), and 282·11 m.p.h., that of Fl.-Lt. D'Arcy Greig (R.A.F.), who, at Calshot, 1929, reached 319·57 m.p.h. On a super-marine Rolls Royce S. 6 Sqdn.-Ldr. A. H. Orlebar set up, also in 1929, at Calshot, a world's record for 3 kilom., averaging 355·8 m.p.h. The U.S. Army monoplane flight of Jan. 7, 1929, lasting 150 hrs., was remarkable for the feat of refuelling in the air, a performance which was repeated by two other American airmen in May 1929 during a flight of 172½ hrs. The altitude record is held by Lady Heath, who, in 1928, reached 23,000 ft. The most recent airship to cross the Atlantic is the *Graf Zeppelin*, which left Friedrichshafen on Oct. 11, 1928, and reached Lakehurst, New Jersey, in 111½ hrs. (return journey took 71 hrs.), covering 6300 m., and going via France, Gibraltar, Funchal, the Azores, and Virginia. The commander was Dr. Hugo Eckener, the designer, and with him was a crew of 40, including Lt.-Cmndr. C. Rosendall, commander of the U.S. airship *Los Angeles*. The flight was successful despite storms, wind and fog, and from the time taken indicates a considerable advance since 1919, when the British dirigible *R 34* flew from East Fortune, Scotland, to Mineola, New York, or 3130 m. in 108 hrs. The only other crossings were in 1924 by the *Los Angeles* from Lake Constance, in somewhat better time and by the British Airship *R 100*, which flew from England to Montreal in Aug. 1930, taking about 5 days. The *Graf Zeppelin* was flown round the world in 1929, taking 21 days and reaching Lakehurst Aug. 29. (*See also* AIRSHIPS.) A remarkable experiment, but only partly successful, was that of Juan de la Cierva, who in 1928

crossed the Channel in a autogyro at a speed of 90 m.p.h. and toured England for 3000 m. This machine was wrecked a few days later, owing, it seems, to a broken landing cable rather than to any structural defect (*see under* AEROPLANE).

In commercial development it is probable that the U.S.A. are ahead of Great Britain, in that the aeronautical industry has so far secured the co-operation of the banking and [illegible] e emerged lependent supported In this he Daniel to assist stimulate elopment, are now able to concentrate on aerodynamics and cognate problems. (For designs of and developments in aeroplanes *see* AERIAL ENGINES; AEROPLANE; for progress in theories of viscosity and allied topics *see under* AERODYNAMICS.)

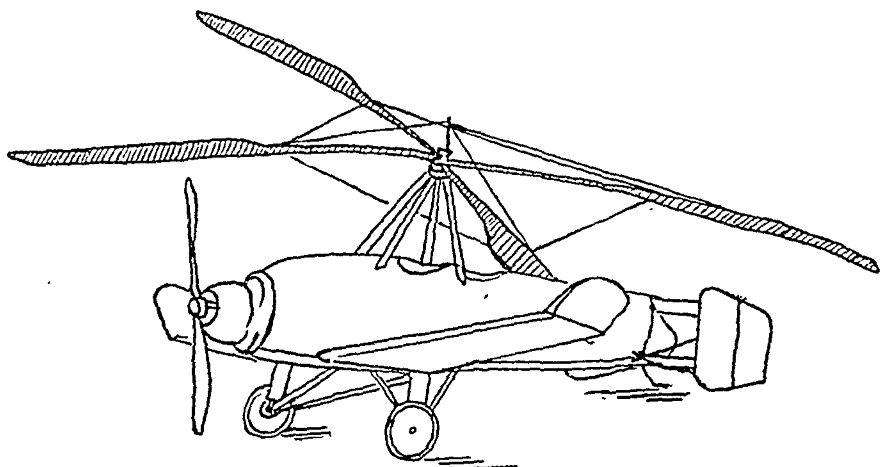
Aerophore: 1. A device for inflating the lungs of a still-born child with air. 2. An apparatus used by firemen and others to prevent the inhalation of noxious gases; a small supply of air is used over and over again, being purified by chemicals after each expiration.

Aeroplane. Heavier-than-air machines comprise monoplanes and biplanes. A monoplane is a machine with a single spread of surface supporting it. The best known of the early examples of monoplanes was the Bleriot. Biplanes have two supporting surfaces, the one above the other; the Wright and Farman were machines of this type. Other machines have been invented which had more supporting surfaces than this, the best known being the Roe triplane. But the triplane has almost dropped out, nor has any other type reached a sufficiently high standard to be able to compete with the monoplane and the biplane. The monoplane and the biplane both have their own special uses. The former is generally the lighter machine, and its head resistance is much less, whence it follows logically that its speed will be greater than that of the latter. But the biplane is a much more stable machine, and will generally be safer and able to carry a greater weight. The developments in A. construction have, however, meant an increased efficiency for the monoplane. These distinctions between the types, however, depend on the construction being of wood and fabric. Spruce, ash, hickory and pine are used in this construction, and the framework of the machine is covered with linen fabric which is strengthened with a dope or varnish. But modern engineering is finding it possible to build As. entirely of metal. With metal aerofoil (or wing) structures the monoplane can have an extremely large span (estimated at 240 ft.), and is consequently able to carry a large load. The metal most commonly used is duralumin, and this, when used in the construction of seaplanes, has this advantage over aluminium, of which it is an alloy, that it is unaffected by sea-water. Corrosion is a serious problem in metal construction, and experiments are being carried out in stainless steel. Professor Junkers, one of the pioneers in all-metal construction, was the first to use corrugated metal for the covering of both wings and fuselage. *The Silver Streak*, built by Short Bros., was lighter than a wooden machine of similar size and capacity. Metal machines are now being standardised for the R.A.F.



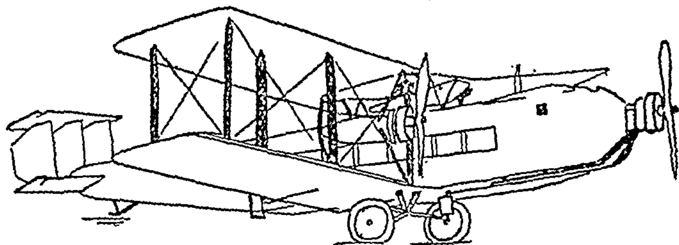
FAIREY MONOPLANE

One advantage of the monoplane, as stated previously, is that it offers less resistance to the air at a given speed than the biplane, and therefore requires less horse-power. Flying is only possible through continued movement, which is called, in this connection, 'thrust.' The essential thrust is given by the airscrew, but owing to the inefficiency of the screw, caused by the fact that it is moving through a fluid, 25 per cent. of the engine-power is lost. The airscrew is, strictly, only properly called a 'propeller' when it is placed in rear of the engine. A machine of this type is called a 'pusher.' When the airscrew is in front of the engine, the machine is called a 'tractor.' A certain thrust is necessary before the A. can overcome the air-resistance, and the minimum speed at which this is possible is called the 'stalling speed.' When this speed is reached, the pressure of the air underneath the wing and the suction of the air on top enable the plane to rise. When it is flying level, the total lift of the air must be equal to the total weight of the machine. The A. will rise or fall according as the weight is smaller or greater than the total lift. The resistance made by the weight of the machine depends on the horse-power developed by the engine, and for this reason the engine is the main factor for controlling the altitude of an A. Besides the engine, the three other controlling units are the rudder, the elevators, and the ailerons. The rudder, operated by a foot-bar, is attached to the tail of the A. and works like a boat's rudder. The elevators are flaps hinged behind the tail-plane. When raised, the A. climbs; when lowered, it descends. The ailerons are flaps hinged at the extremities of the main planes. If one is lowered and the other raised, the lifting force is increased on one side and decreased on the other. The suction of the air is greater on a curved surface. Use has been made of this, and greater efficiency is given to the modern A. by the curvature or 'camber' of the aerofoil like the wing of a bird. Thick, curved wings give a greater lift, while thinner and more delicately-curved wings offer less resistance to the air and are more suitable for fast flying. Wings are also constructed to slope upwards at an angle, called the 'dihedral angle,' from the centre to the tips, thus ensuring a greater stability in flight. If an A. falls below flying speed, it is said to be 'stalled.' This danger has been lessened by the Handley Page slotted-wing device, which enables part of the wing to be opened or shut, something like a venetian blind, thus allowing the A. to rise or land at a slower speed. To overcome the need in an A. of both speed and space to begin and end a flight, Señor de la Cierva invented the autogiro. (*See also* under AERONAUTICS.) This machine is a more or less normal A., surmounted by a set of rotating vanes, like windmill sails, fixed to a pylon structure over the centre of gravity. They rotate freely in the wind caused by the forward motion of the machine, and, when the engine is shut off, they enable the machine to land almost vertically with a very low landing speed. Stalling is impossible. A similar machine, at pre-



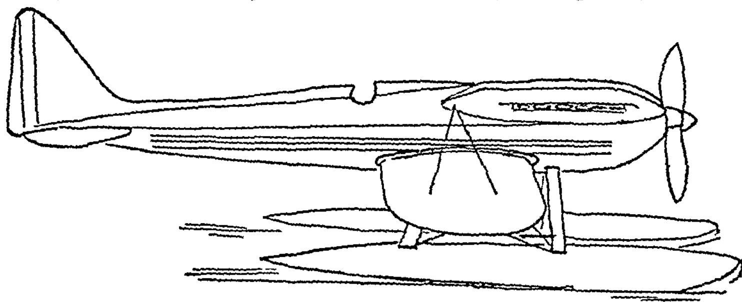
THE AUTOGIRO

sent in the experimental stage, is the helicopter. The overhead propeller, which gives the vertical life, is, however, not free to rotate, as in the autogiro, but is under power from the engine. On experiments in machines of this type depend any future developments in the direction of an aero-omnibus.



'ARMSTRONG WHITWORTH' PASSENGER BIPLANE

As. are now put to a variety of uses. After having being designed to disseminate bombs, the A. is now being used to sow seed over vast areas of corn-land. It is also invaluable for distributing pest-killer over forest-land or fever-swamps. The greatest advantage of the A., however, is the facility it affords for rapid travel.



'SUPERMARINE' RACING SEAPLANE

Air-routes are established, linking up practically all parts of the world; but for long journeys covering land and sea the suitability of the A. is restricted, unless it can land and start anywhere at any time. To this end the amphibian type of A. has been designed, combining the capabilities of a landplane and a seaplane. In 1920 a prize of £10,000, offered by the Air Ministry for the most successful amphibian, was won by the Vickers *Viking*.

Future developments of the amphibian may bring it into universal use, but at present the majority of passenger As. are of the ordinary biplane type. The Armstrong Whitworth *Argosy* is a typical example of the passenger A. in use on the Imperial Airways. It is fitted with three Jaguar air-cooled engines and is under dual control. It accommodates 20 passengers and also has full navigational and night-flying equipment, together with Marconi wireless apparatus. The Handley Page Co. are also constructing for the Imperial Airways, Ltd., an air-liner, fitted with four engines developing a total horse-power of 2000. It contains two saloons, seating 20 passengers each, also wireless rooms, luggage compartments, buffet, and lavatories. Span is 135 ft.; length 89 ft.

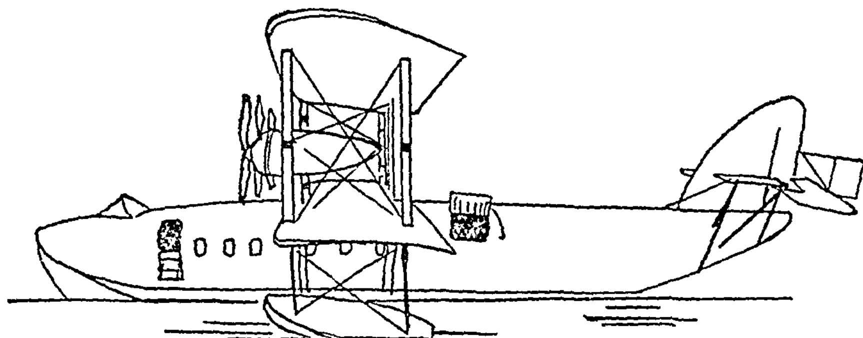
Short Bros. are the oldest established A. makers in Gt. Britain, and the firm has concentrated on producing an all-metal flying boat, of which the *Calcutta* is a typical example. The *Calcutta* seats 15 passengers, who have all amenities of travel, and it carries three 525 h.p. engines (Bristol Jupiter ix). The wings and hull are duralumin covered, but the fittings to the spars and in

the hull are of stainless steel. With a full load of 24,000 lb. the *Calcutta* has a take-off of 32 secs. and an initial climb of 710 ft. a minute. At 500 ft. its speed is 103·8 knots.

Designed for speed only, a seaplane constructed by the Supermarine Co. and fitted with Rolls-Royce engines has twice won the Schneider Trophy. The latest type is all-metal and capable of a speed of 332·49 m.p.h.

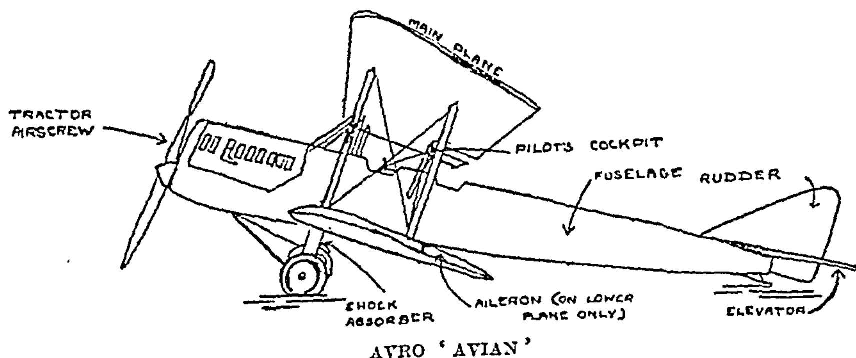
The veteran Vickers *Vimy* biplane must be mentioned, because it was in a machine of this type with twin Rolls-Royce engines that the first Atlantic flight (*see* ATLANTIC FLIGHTS) was accomplished. The famous *Vimy* A. is now to be seen at the Science Museum at S. Kensington. In 1919 a machine of the same type was the first to fly from England to Australia in under 30 days, thereby winning the prize offered by the Australian Government. The *Vimy* A. was designed originally as a bomber, but after the war a successful passenger machine was constructed of this type.

A modern development of aircraft is in the light A., of which the Avro *Avian* and the De Havilland *Moth* are noteworthy examples. The *Avian* is a two-seater light biplane, and in 1928 a machine of this type also made the London-to-Australia flight. The time taken, however, has since been reduced to under 13 days by the *Southern Cross*, an A. of the celebrated Fokker design. The light A. of the 'Moth' type is in popular demand by aero clubs and for private ownership.



'SHORT' FLYING BOAT

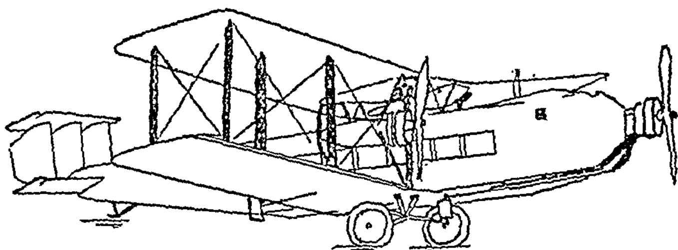
Private and commercial enterprise in the air largely depends on freight capacity and on safety. Every A. is built for a certain total weight, called the full flying load, which on no account may be exceeded. The 'useful load,' passengers, luggage, mail, etc., requires careful distribution to ensure even flight. Safety, of course, is all-important. Every pilot has to fulfil very stringent Government requirements before certificates are granted, and all construction is under Government supervision. Chances of fire in the air are small, and are further minimised by metal construction. Multiple engines also eliminate the danger of



AVRO 'AVIAN'

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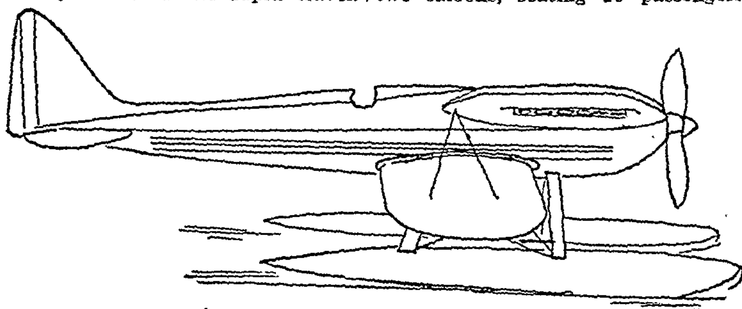
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Future developments of the amphibian

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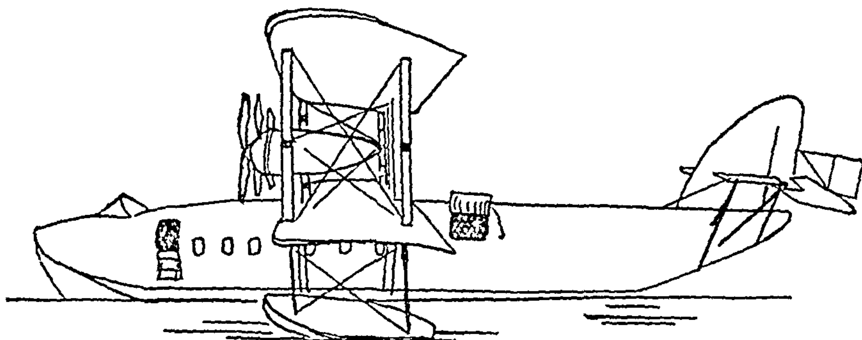
the hull are of stainless steel. With a full load of 24,000 lb. the *Calcutta* has a take-off of 32 secs. and an initial climb of 710 ft. a minute. At 500 ft. its speed is 103·8 knots.

Designed for speed only, a seaplane constructed by the Supermarine Co. and fitted with Rolls-Royce engines has twice won the Schneider Trophy. The latest type is all-metal and capable of a speed of 332·49 m.p.h.

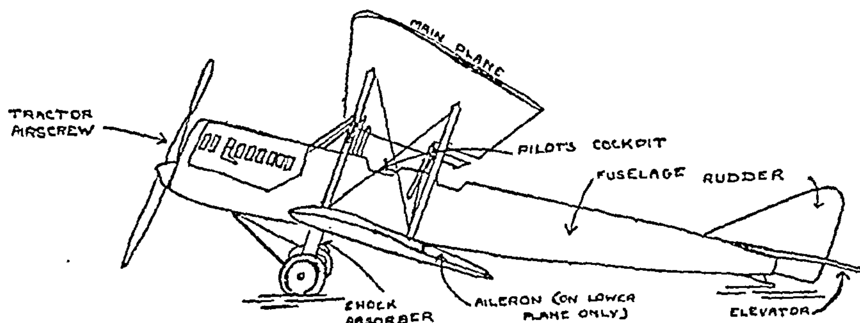
The veteran Vickers *Vimy* biplane must be mentioned, because it was in a machine of this type with twin Rolls-Royce engines that the first Atlantic flight (*see* ATLANTIC FLIGHTS) was accomplished. The famous *Vimy* A. is now to be seen at the Science Museum at S. Kensington. In 1919 a machine of the same type was the first to fly from England to Australia in under 30 days, thereby winning the prize offered by the Australian Government. The *Vimy* A. was designed originally as a bomber, but after the war a successful passenger machine was constructed of this type.

A modern development of aircraft is in the light A., of which the Avro *Avian* and the De Havilland *Moth* are noteworthy examples. The *Avian* is a two-seater light biplane, and in 1928 a machine of this type also made the London-to-Australia flight. The time taken, however, has since been reduced to under 13 days by the *Southern Cross*, an A. of the celebrated Fokker design. The light A. of the 'Moth' type is in popular demand by aero clubs and for private ownership.

Private and commercial enterprise in the air largely depends on freight capacity and on safety. Every A. is built for a certain total weight, called the full flying load, which on no account may be exceeded. The 'useful load,' passengers, luggage, mail, etc., requires careful distribution to ensure even flight. Safety, of course, is all-important. Every pilot has to fulfil very stringent Government requirements before certificates are granted, and all construction is under Government supervision. Chances of fire in the air are small, and are further minimised by metal construction. Multiple engines also eliminate the danger of



'SHORT' FLYING BOAT



AVRO 'AVIAN'

cisms, that he was flung over a precipice at Delphi. Aristophanes says that the fables were popular in his time. While Socrates was in prison he rewrote those of the fables familiar to him, in verse. The fables themselves are believed to have been derived from very early sources, and they gain considerable value from a theory that some of them can be traced so far back as Buddha, in a collection of his birth-stories. The only Gk. version is that of Babrius.

Æstheticisms. This word, which in its original and general sense implied an attachment to æsthetic principles, came to be applied particularly to a movement in art which in the seventies and eighties of last century was characterised by many whimsicalities and absurdities. Arising from a natural and healthy reaction against the ugliness and philistinism of the mid-Victorian period, under Oscar Wilde and others it developed tendencies which justly made it the butt of much ridicule, drawing down on it the shafts of satire of Du Maurier in *Punch*; and W. S. Gilbert in his opera *Patience*, 1881, ridicules one Bunthorne, who walked down Piccadilly, with a poppy or a lily in his mediæval hand. But the saner adherents of the movement, such as Ruskin, Morris, Leighton, and the pre-Raphaelite school of painters, did much to spread the appreciation of the artistic among their countrymen.

Æsthetics is the name given to that science or philosophy which treats of the beautiful and attempts to establish the principles and theories upon which works of art are based. The word is derived from the Gk. αἰσθητικός (that which concerns feeling or perception), and it was in Greece that the theories of Æ. were first propounded. As instancing the importance attached to this subject by the philosophers of classical antiquity, one recalls the amount of attention devoted to it by those twin giants of intellect, Plato and Aristotle. The name of Plato will always be remembered in all discussions on the nature of the beautiful, whilst Aristotle in his discourse on the theory of art in poetry, contained in his *Poetics*, contributed to æsthetic literature the most important work among the ancts. In it he treats of tragedy, a form of ramatic art carried to great heights y the dramatists of his time. His anons of criticism, many of which e still valid, include the assertion at beauty was the mean between o extremes, neither too large nor o small. Plato's teaching on the bject is in keeping with his general sition, *i.e.* of an absolute and per- t ideal behind all appearance. From this it follows that beauty finite things arises from their corr spondence to their ideal archetyp This doctrine of Plato is expressed b the poet Keats in his *Ode on a Grecia Urn*, in which he expresses th opinion in the oft-quoted lines 'Beauty is truth, truth beauty—tha is all Ye know on earth, and all ye need to know.' The science of Æ. has been divided into subjective and objective. The objective side deals *inter alia* with the relationship of art to nature, the classification of the sev. arts, and the definition of their functions and limitations. Subjectively the question is one largely of psychology and an attempt to determine the nature and origin of æsthetic judgment or taste, and this dept. of the science is further subdivided into consideration of the conditions of artistic *production* and of artistic *appreciation* or perception. The latter aspect of the theory is put succinctly in the phrase that 'Beauty resides in the eye of the beholder.' The modern science of Æ. may be said to have been inaugurated by the publication in Frankfort at about the middle of the eighteenth century of *Æsthetica*, a book by Baumgarten, a disciple of the Ger. philosopher, Christian Wolf. In this work, which earned him the title of the father of modern Æ., he differentiates between truth, which is apprehended by reason, and the beautiful, which is perceived by sense, which, he maintains, is on a lower plane of intellect. Following Baumgarten came a whole host of Ger. philosophic writers, who can only be briefly enumerated here. First comes Winckelmann, who developed Baumgarten's theories. Lessing in his *Laocoön* defined the spheres of poetry, painting, and sculpture. Schiller, the poet, who by influencing Goethe influenced the current of European thought, defined the secret of art as the supercession of the *matter* by the *form*. Kant denied the possibility of a strict science of beauty, as he regarded it as subjective. Fichte and Schelling, Herbart and Schopenhauer are the names of other Ger. æsthetic writers, the place of art being exalted in the latter's philosophy, but the colossal figure of Hegel dominates all, his *Lectures on Æsthetics* being the chief work on the subject. Eng. writers include Hume, Burke, Alison, and Ruskin, and the Fr., Diderot and Buffier, but, as will be seen by the space devoted to their writers, in the matter of Æ. the German hegemony is practically unchallenged.

Æstivation (Lat. *æstivus*, belonging to summer), or Præfloration, in botany, is a term to describe the way in which the floral organs are arranged

in the flower-bud, as vernation or perfoliation describes the arrangement of leaves in a leaf-bud. If the parts do not touch, the Æ. is *open*, if they touch but do not overlap it is *valvate*, if they overlap it is *imbricate*. When the Æ. is such that two parts overlap completely, two parts are *completely overlapped*, and one part overlaps at one edge and is overlapped at the other, it is called *quincuncial; convolute* or *contorted* when each part overlaps another and is itself overlapped at one edge.

Æstivation (Lat. *æstivare*, to pass the summer), or **Estivation**, in zoology, a state of dormant vitality in summer of some animals, such as land-snails, in warm climates which prevents them from suffering from heat or drought. It is opposed to hibernation, which is a state of dormant vitality in winter.

Aetas, the name by which the Negritos of the Philippine Is. are known among themselves. They are dwarfish in stature, with round heads, bulging foreheads, large eyes, and woolly hair, and are almost wholly uncivilised.

Æther, or **Ether**, a medium permeating all matter and space, the movements of which constitute the waves which give rise to the sensations of heat and light. The idea of an exceedingly tenuous medium pervading the whole universe has suggested itself to philosophers of all ages. In the Hindu mythology it is given as one of the five elements: earth, water, fire, air, and ether. Descartes elaborated a vortex theory of matter, in which he conceived all space to be filled with one substance whirling round in great vortices. It was thus he explained the formation of the solar system, particles flying off from the centre to the circumference constituting the light radiated from the sun. Leibnitz in 1671 declared his belief in an Æ., a fine substance permeating all bodies in the direction of the earth's axis and producing the phenomena of gravity, elasticity, etc. Kant pub. in 1755 a thesis which postulated an Æ. connecting *all* matter. It seemed necessary to him, in order to explain action at a distance, that bodies should operate upon each other by means of an elastic and subtle medium, uniformly diffused through the universe. This medium, he was convinced, was the underlying substance of heat and light.

The later development of the conception of an Æ. occurred mainly in connection with the mathematical treatment of physical phenomena, particularly with regard to the propagation of light. Newton conceived light to be occasioned by particles moving with great velocity in straight lines from the source. He explained refraction by assuming periodic changes in the velocity of the light corpuscles; they have, he said, alternate fits of easy reflection and easy refraction, and it depends on which of these a particle is in when it reaches the surface, whether it will be reflected or refracted. A ray of white light, he maintained, consists of many particles with differing periods of refrangibility and reflectibility, the most refrangible causing the sensation red, and the least refrangible producing violet. Newton objected to the wave theory held by Huygens and his supporters in that it did not explain the rectilinear propagation of light, or the phenomenon of double refraction. It was inconceivable, he also said, that a medium should be so transparent that light could reach us from stars known to be enormous distances away. Nevertheless the wave theory was to triumph; investigation of the phenomena of interference and polarisation (*q.v.*) led to them being explained by undulatory motion, so that the corpuscular theory hardly survived the eighteenth century.

In 1801 Thomas Young once more put forward the hypothesis that luminiferous Æ. pervades the universe, that it is rare and subtle in a high degree, and that it is by vibration in this medium that light is propagated. The Æ. was conceived of as offering no opposition to the passage of material substances; 'it passes through them,' he said, 'like the wind through a grove of trees.'

The existence of Æ. had been assumed to explain light-waves, it was therefore necessary, in order to avoid postulating different kinds of media, to discover some connection between light propagation and other physical processes acting through space. Faraday showed that iron filings spread on a card held over a magnet arrange themselves in a series of curved lines between the poles. These were called lines of force and indicate some disturbance or stress in the medium connecting the poles of the magnet. He also showed that an electric current was induced in a continuous conductor cutting the lines of force. For years he attempted to discover whether magnetism had any effect on polarised light, until in 1845 he succeeded in producing the rotation of the plane of polarised light by transparent dielectrics in a magnetic field. Thus magnetic force and light were shown to have a relation to each other, and the Æ. was now looked upon not only as the light medium, but as the medium of electric disturb-

ances as well. Faraday's work was carried further by Clerk Maxwell and Lord Kelvin. The latter connected magnetic force with a rotatory movement of the Æ., the energy of irregular translation constituting heat, the theory of the transformation of energy being thus considerably advanced. By calculating from the energy of solar radiation near the sun's surface, Kelvin obtained a value exceeding 10^{-18} for the density of Æ., that is to say, 1,000,000,000 cu. m. of Æ. would have a mass of over 1 lb. The further investigation of mathematical values in connection with light-waves led Sir Joseph Larmor to the conception that Æ. corresponds to a solid with a density considerably greater than any known substance and quite incompressible. To sum up: the Æ. has long been regarded as the vehicle of Light. During the nineteenth century it was regarded as the medium, filling all space, through which light, gravitational forces, and electromagnetic waves were propagated; it was widely believed that the Æ. was material, having the properties of matter such as mass, rigidity, and motion. Matter itself was regarded as vortices in the Æ., but this view was abandoned as being illogical, since the Æ. could not consist of vortices in the Æ. Michelson and Morley in 1881 and 1887 attempted to discover the existence of an Æ.-drift at the earth's surface, and their experiments, which gave negative results, led to the Principle of Relativity. Sommerfeld says 'that nowadays we live to avoid speaking of the Æ., since the theory of Relativity has deprived it of its material existence in the older sense,' but, as Eddington points out, 'this does not mean that the Æ. is abolished.' 'It is agreed that the Æ. is not a kind of matter, and, being non-material, its properties are *sui generis*—it has definite characters of its own.' Sir Oliver Lodge indicates some of its roperties: it fills all space in the nost thorough manner, it is absoutely cold, it is absolutely transarent and undispersive, it is devoid f viscosity, it is the sole vehicle f radiation, *i.e.* of light, *X*-rays, ireless waves; electric and magetic fields are forms of energy isting in the Æ., and since all rieties of matter are ultimately ectrical in origin, being composed of otons and electrons, Lodge asserts at 'the Æ. is indirectly responsible all physical and chemical activity.' hat other functions this universal dium may be found to possess, and ether life and mind can be in any associated with those functions, it must be left to posterity to fin out.'

Æthiopia, *see* **Ethiopia.**

Æthopyllum (Gk. *αἶθος*, flame *φύλλον*, leaf), a name given by Bron gniart to a fossil genus of palms.

Æthrioscope, an instrument adapted to measure changes of temp. produced by impressions from the upper atmosphere. It was invented by Sir John Leslie, who described it in 1818 in a paper appearing in the *Transactions of the Royal Society of Edinburgh*. The essential part of the instrument is a differential thermometer, one bulb of which is fixed in the focus of a concave mirror. This enables slight changes in temp. produced by radiation to be noted.

Æthusa, the anct. name of Favignana, the largest of the Ægadian Is., in the Mediterranean. It is 6 m. long, and has a pop. of 7000.

Ætiology, *see* ETIOLOGY.

Aetion, or **Eetion**, a Grecian painter *b.*, according to Pliny, 350 B.C. References are made to him by Cicero, Pliny, and Lucian. He was contemporary with Alexander and Apelles. His chief work represents the marriage between Alexander and Roxana. At an exhibition in the Olympic Games he won the admiration of the president, who was sufficiently struck by his work to give him his daughter in marriage.

Aetius, 'the Atheist,' a native of Cœle-Syria, flourished in the fourth century A.D. After following various trades he became a doctor. He gained distinction particularly in medical controversy. Leontius of Antioch installed him deacon, but his heterodox views caused his banishment from the tn. In 356 A.D. he went with Eunomius to Alexandria, only to be sent into exile by Constantius. He was recalled by Julian, and elevated to the rank of bishop. Here he used his influence on behalf of Arianism. He retired upon the succession of Valens, and *d.* in 367. A work of his that survives, called *De Fide*, attacks the doctrine that the Son is God, on the ground that the fact of being begotten destroys the nature of a god.

Ætius (*c.* 390–454 A.D.), a Rom. general who lived during the latter history of the W. Empire, *b.* in Moesia. He passed his early life as a hostage among the Goths and Huns, using afterwards his intimate knowledge of them to their ultimate defeat. In 424 he invaded Italy at the head of over 50,000 Huns to support Joannes, the proclaimed emperor. His intrigues directed against Count Boniface, his rival, caused that dignitary to revolt. The battle that followed saw the count's death, and the triumph of A., who now rose to be the

most conspicuous figure of the W. Empire. Most of his military glory had been won in Gaul. His greatest victory was at Châlons-sur-Marne, 451, when he led the Gauls against the Huns. He was killed by the Emperor Valentinian, who suspected him of complicity in an attempt to overthrow him.

Ætna, *see* Etna.

Ætobatis, an eagle-ray found in tropical seas. It belongs to the family Myliobatidæ of the Elasmobranchi.

Ætolia, a prov. of N. Greece. It is divided into two natural divs. by the basins of the Lower Archelous and the Euenus. Among the mts., many of which rise above 7000 ft. above sea-level, is Kiona. The soil is agriculturally rich; currants, vines, maize, and tobacco being cultivated with ease in the S.W. plain. The chief tns. are Missolonghi and Lepanto. In the early history of Greece, the Ætolians played a prominent part. The country was created primarily to safeguard an attack from the Macedonians, and rapidly rose to a high position controlling almost the whole of Greece. The Macedonians, however, gradually weakened their forces, till, after the disastrous conflict with the Romans, their power had almost been sapped away. In the fifteenth century Æ. was brought under Turkish control. To-day with Arcanania it forms part of the kingdom of Greece. The N. region is wild and barren, the only inhabitants being Vlach shepherds. Area 3020 sq. m. Modern Province is Acarnania and Etolia; pop. of Prov. 220,000.

Afanasiev, Aleksandr Nikolaevich (1825–71), Russian scholar, was *b.* at Moscow, and wrote on archæology and folk-lore. His chief works are *Poetical Views of the Old Slavonians about Nature*, 1866–68, and *Russian Popular Stories*, 1873.

Afer, Domitius (16 B.C.–A.D. 59), Roman orator, was *b.* at Nemausus (Nîmes), and became the preceptor of Quintilian. Under Tiberius he betrayed to death Claudia Pulchra and Q. Varus, and in Caligula's reign he was made consul. He died of over-indulgence. *See* Tacitus, *Annales*, iv. 52; xiv. 19; Quintilian, v. 7.

Afeerers, *see* Leet.

Affettuoso, an It. musical term, indicating that a passage should be played with expression, affectionately or tenderly, in a movement between adagio and andante. *Affetto* or *con affetto* is used variously with this term.

Affidavit, a statement of facts in writing made upon oath, or by a solemn affirmation, before a magistrate or commissioner for oaths. The word is derived from the old Lat. form of a declaration on oath, which commenced thus, 'Affidavit M. N.' *i.e.* 'M. N. has sworn.' The employment of affidavits is generally confined to litigation, but sometimes the A. is employed to lend force to a public statement, for the person who knowingly and advisedly falsely swears to an A. is liable to punishment for perjury. In judicial proceedings the A. is used in lieu of oral evidence, and particularly is this the case in interlocutory applications. Sometimes the whole of evidence may be taken by A., and this was especially the case in the old Chancery courts, but as a rule this practice is discouraged.

Affiliation. An A. order is an order made by an English court of summary jurisdiction, ordering the father of an illegitimate child to pay a sum not exceeding twenty shillings a week for the maintenance of that child until the age of 16. In Scotland the rate of maintenance of 'aliment' varies, but does not exceed £11 14*s.* a year. The uncorroborated testimony of the mother is not sufficient proof of paternity, and an appeal to the quarter sessions may be made. Failure to comply with an order is punishable by imprisonment. Although necessarily attended with risks, the Eng. system of A. is generally conceded to be in advance of the Fr. code, which forbids '*recherche de la paternité*.'

Affinity, in law, relationship through the fact of marriage. On the principle that man and wife are one flesh, one party to a marriage bears to the relatives of the other party a relationship by A. which is determined by the latter's blood-relationship, or *consanguinity* (*q.v.*). A. is only important in connection with the marriage law, which in England and Scotland is based in this respect on the Mosaic law as set forth in Lev. xviii. An important exception to the general rule that marriages are prohibited within the same degrees of A. as of consanguinity is provided by the Deceased Wife's Sister Act of 1907, which allows marriage between a man and a woman standing in that relationship. The objections to marriage within certain degrees of A. as distinct from consanguinity rest mainly on religious grounds; scientific observation having disclosed no reason for supposing that such marriages would result in degeneration.

Chemical A.—The property in virtue of which atoms or groups of atoms tend to enter into chemical combination with other atoms or groups. *See* Chemistry, Electrolysis, Valency.

Affirmation, a solemn declaration prescribed by the Oaths Act of 1888 as a substitute for an oath in all cases

where for conscientious reasons a person objects to being sworn. An A. in court is subject to the same

and gradually extended to other categories of people. See OATH.

Affix, a term in grammar which signifies a syllable attached to the end of a word. It is also called Suffix.

Affleck, Sir Edmund (1723–88), a rear-admiral in the British navy, went with Rodney to relieve Gibraltar, 1779, and distinguished himself for his services in the West Indies against the Fr. 1782.

Afforestation (from Lat. *ad*, to, and Low. Lat. *forestis*, a wood). The planting of trees in sparsely wooded districts for the purpose of converting them into woods and forests. During recent years the system has received much impetus from a more intelligent recognition of its significance, and Sir Henry Rider Haggard was responsible for much of the progress it has made. He was appointed a member of the Royal Commission on Coast Erosion and A. in 1906, a body which has considerably furthered the interest now shown in A. The noticeable migration of the rural population to the large industrial centres, the damage caused by deer and hares, the clearances which take place to render accessible for gaming purposes our forests, emphasise the urgency and value of A. as an economic factor. The system is most thoroughly and successfully carried out to-day by Germany and Switzerland. The chief cause of failure and difficulty of operation has been, hitherto, the lack of co-operation between theorising experts and practical forest men. An instance to demonstrate the value of the system may be found in the Saschenwald, where land that was previously worth 3s. an ac. is now, after A. operations, worth 50s. an ac., and the industries allied to the movement give employment to the large figure of 4,000,000 people. Moreover, a foreseen shortage in the output of coniferous timber is only to be counteracted by the application of such a scheme. To indicate clearly just what considerable benefits would accrue from A., it has been shown on trustworthy evidence that our own shortage of supply and inferiority of quality could be so improved that where we

the subject in Germany can be imagined when even forty years ago there were twenty-seven chairs of forestry in the Munich University. It would be possible to produce all the wood pulp in our own is. while, so far, we produce none.

In 1909 provision was made in the Budget of that year for the establishment of a body of commissioners whose duty it would be, by aid of an annual grant of money, 'to develop some of the neglected resources of the country,' £200,000 being ear-marked for this purpose. The Development Commission naturally considered the question of A., and made tentative beginnings in this direction by the purchase of land in Scotland and Ireland, as much as £30,000 being expended for this purpose in 1911 in the latter country. In the U.K. forestry has always lacked the systematic co-operation which in Germany, the U.S.A., and other countries is commonly afforded by the state. Thus it is that only about 4 per cent. of the country is under timber, and supply necessarily depends on the activities of private landowners. The scarcity of home-grown timber was acutely felt in the Great War, and high prices had perforce to be paid for imported timber. Even before the war a tentative beginning was made in 1913 by the establishment of Forestry Branches by the Board of Agriculture and the Office of Woods, whose expenses were defrayed from the fund created by the Development and Road Improvement Funds Act, 1909. But it required nothing less

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Forestry Act was passed to provide for the acquisition and A. of land in the U.K. so as to be independent of foreign supplies in an emergency up to a period of 3 years. Later a Forestry Commission was set up and given wide powers for promoting A. in the U.K. The Commissioners are empowered to buy or lease land, advance loans or make grants to encourage A., whether by local authorities or private owners. Three Assistant Commissioners were appointed executive work , Scotland and met from a Fo for which is made by payments up to £3,500,000 during 10 years from April 1919. The Forestry Act 1927 authorised an increase of the number of Forestry

Commissioners and empowered them to make bye-laws with respect to land vested in them or under their management or control. By the combined operation of the Forestry Acts 1914–27 the Commissioners are charged with the general duty of developing A., and promoting the production of timber in Great Britain. Together with the former Crown Woods now transferred to the Ministry of Agriculture that Department has now (1930) acquired about half a million acres of land and planted about 100,000 acres.

Affre, Denis Auguste (1793–1848), archbp. of Paris, *b.* at St. Rome-de-Tarn. Educated at St. Sulpice, he became in 1818 professor of dogmatic theology. As archbishop he endeavoured to establish peace between the soldiers and insurgents during the rebellion of 1848. Wearing a green branch to denote his peaceful intentions, he mounted a barricade. He was killed by a stray bullet. Among his works are many valuable treatises and an *Essai sur hiéroglyphes Egyptiens*, where he showed Champollion's system of translation to be faulty.

Affreightment, *see* BILL OF LADING; CHARTER-PARTY.

Affry, Louis - Augustin - Philippe, Comte d' (1743–1810), Swiss soldier and magistrate, *b.* at Fribourg and *d.* at Berne. He commanded the Fr. army of the Upper Rhine until 1792, when he retired to Fribourg. He became Landamann or head of the Helvetic Confederacy in 1803, and later served under Napoleon.

Afghanistan is a country situated at the N.W. of India. Placed between Asiatic Russia and British India, it owes its importance politically to its position as a 'buffer' state between the two regions. It is bounded on the N. by Russian Turkestan, on the W. by Persia, and on the E. by Kashmir and the independent tribes of Baluchistan and its neighbourhood. It extends 400 m. from N. to S. and 600 m. from E. to W. Its area is approximately 240,000 sq. m., being twice the size of Great Britain and Ireland. The provinces comprised within the A. limits are Northern A. or Kabul, Southern A. or Kandahar, Herat, and Afghan Turkestan.

The mountain system of A. contains the Hindu Kush range, with its continuation the Koh-i-Baba and the Firozkhoi plateau. Of the Koh-i-Baba peaks, Shah Fuladi (16,870 ft.) is the highest. Next in importance to the Hindu Kush and Turkestan mountains are the Safed Koh, whose highest peak is Sikaram, which is 15,600 ft. above sea level. The rivs. may be divided into the three principal basins of the Oxus, Indus, and Helmano. In the Oxus basin the Murghab and the Hari-Rud owe considerable value to their geographical position, as well as to the richness of their valleys. Before, however, these rivs. reach the Oxus, they disappear. Indeed, of the many streams that flow from the northern slopes of the Hindu Kush, only two reach the Oxus, these being the Kokcha and the Kunduz. In the basin of the Indus is the Kabul and its tributaries, which flow from the southern slopes of the Hindu Kush and the valleys of the Safed-Koh; the Kuram, and those streams flowing from the Waziri Hills and the Sulaimans. The Helmand, fed by the Argaudab, the Tarvak, and the Arghastan, waters the whole of S.E. Afghanistan.

The climate, owing to the different altitudes, is very varied, and suffers sudden and severe extremes. The temp. for the greater part of the year changes through the extraordinary range of 30° in a day. In the N. the winter is marked by a lasting and rigorous severity; while in the Oxus country the heat of summer reaches 120° F. To the severities of the intense heat are to be added the frequent dust-storms and fiery winds; while the night-time is rendered almost intolerable by the radiating heat absorbed during the day by the vast masses of rock. The most temperate region is at Herat. Generally the climate of A. may be said to be dry, whatever rain it receives being derived from the S.W. monsoon. From the athletic and handsome appearance of the population it would be expected that healthy conditions prevailed. But the existence of frequent and intermittent fevers, and the almost universal suffering from bowel complaints, rendered easy by the too-heavy abuse of a fruit diet, prove very costly to life.

The Afghan peoples contain such tribes as the Duranis, Ghilzaî, Hazara, Chaihar-Amak, Tajiks, Ugbegs, and Kafirs. The religion throughout the whole of the country is Mohammedan. Although Pushtu is the prevalent language, that of the court and Afghan literature is Persian. The literature of the country is significant enough to be given the name, most of it being poetry, especially of the ballad kind. The best-known poets are Abdur Rahman (seventeenth century) and Khushal Khan, of the time of Aurungzebe. The education of the people is of a most primitive kind. Of centres of learning for the sons of the more affluent there exist none. The children are taught to read and write

by the priests, whose text-book is, of course, the Koran.

A. is ruled by an absolute monarch, the Amir, whose successors claim accession by right of heredity. He is assisted by a council, or durbar, consisting of three classes of chiefs: Sirdars, who are representative of the people; Khans, who are elected by the tribes; and Mullahs. Under the king are five governors (naibs). To these governors the nobles or judges are responsible for their administration. The Afghanistans claim descent from King Saul, calling themselves 'Beni-Israel' (children of Israel). As a people, the Afghans are of dignified and noble bearing. Their predominant trait of character is keen and acutely developed treachery and cunning. Travellers are regarded with suspicion, the imposition of taxes and the punishment of crime as tyranny. Their chief occupation is agriculture.

The natural productions of A. include castor-oil and tobacco from Kandahar, wheat, barley, cotton, grapes, melons, and the mulberry from Herat. The ash, elm, apricot, apple, plum, quince, peach, and pomegranate are grown, and form the principal fruit, a branch of cultivation which absorbs considerable attention, though difficulty arises in the matter of collection, on account of the scarcity of labour. In some parts the pistachio, valuable for its dyeing qualities, is cultivated. Industrially, the chief articles manufactured are carpets, poshtar, *i.e.* clothing made from sheepskin, and cloth materials from the many varieties of goat-hair. Silks are manufactured at Herat and Kandahar, which towns owe considerable importance to this industry. Exported to India by the Kandahar route are wool, silk, dried fruit, madder, assafetida, and tobacco. Imports include cotton goods, sugar, and tea. All the carrying is done on the backs of camels and ponies, though even this crude system of transport suffers from misgovernment and constant warfare. The principal trade routes from A. to India are those connecting the Oxus regions with Kabul, and those which lead from Kabul, Ghazni, and Kandahar to the Indian plains.

The early history of A. is so involved in obscurity, and records of its development contain so many conflicting attempts to fix its authenticity, that, until the middle of the eighteenth century, little matter definitely concerning its past exists. As has been stated before, the Afghans claim descent from Saul, though their heredity is traced more directly from Kais, a wise man who led a band of men, representing the Afghana, to seek Mohammed in quest of informa concerning his message. Strengt ing this theory are the observation many officers who have spent a c siderable number of years among Afghans, besides the indication their physiognomy of Hebrew desce

A. began its existence as an in pendent country with the reign Ahmad Shah, who was chosen lea by the Afghans, then serving un Nadir Shah, on his assassination. called himself King of the Duranis, clan which is uppermost in A. to-da He extended his dominions ve considerably, and at the battle Panipat (1761) he defeated the sup posed invincible Mahrattas wit crushing effect. In 1773 he *d.*, leav ing his kingdom to his son Timur During his reign extreme condition of utter lawlessness demanded his incessant exertions. He *d.*, leaving twenty-three sons, the fifth of whom, Zaman Mirza, captured the royal position. As was to be expected, strife between the numerous aspirants to the throne waged with barbarous ferocity. Out of the turbulence Kamran gained the coveted position. In 1831 the Persians besieged Herat, and the Russian attitude rousing anxiety, Sir Alex. Burnes was sent to be a resident in the amir's court. The Afghans, however, made terms impossible of acceptance, and, as a result, the First Afghan War was commenced in 1838. Shah Shuja, who had taken refuge, on his fall from power, in British territory, was reinstalled at Kabul. Violent eruptions of insurrection, however, broke out, and found a vent in the massacre of the British officers at Kabul in 1841. A series of calamities followed, resulting upon the many disadvantages which the British experienced. In order fitly to punish these offenders, speedy preparations were made, and Shah Shuja was once more placed on the throne. The position, however, was fraught with many dangerous possibilities. It was natural that the Afghans should resent the action of the British in placing above them a ruler whom they detested, and the native temperament, quick as it is to revolt against the slightest element of compulsion, only served to augment the bitterness of their hostility. For a time a policy of non-interference was maintained. The disaffection, seething in the Afghans, led to the ready alliance of their forces with those of the Sikhs against the British. In 1849, the combined forces were totally defeated by Lord Gough at the battle of Guzerat. A treaty was concluded in 1855, followed by the death of Shah Shuja eight years later. Of his many sons Shere Ali

Khan was willingly recognised as ruler for a time. Disagreement speedily arose, and a state of anarchy followed. During the strife the amir suffered the loss of his favourite son. This bereavement affected him so severely that all active interest in this condition of uncertain and troublous warfare was destroyed. It was not until Kabul was captured, and his dominance in other parts almost entirely alienated, that the Amir Shere Ali began definite operations. For some time, in spite of extraordinary determination and perseverance, he suffered continual defeat. Finally, however, in 1868 he was once more in possession of Kabul. In this ultimate success he was aided by the Viceroy of India, Sir John Lawrence. In 1869, he was informed that the British Gov. intended no further interference with A. affairs, save in the event of a civil war. It was made clear that British influence was intended for the securing of the peace and well-being of the country.

In 1870 Ali's eldest son, Yákúb Khan, rebelled against his father. He had distinguished himself by talent and ability to an exceptional degree. In spite of his efforts he was imprisoned four years later. Abdulla Ján was proclaimed heir-apparent. Following this period a coldness had grown between Shere Ali and the British Gov. Russia began overtures, and in view of the seriousness of possible developments, a British mission was suggested, to make a pacific visit. The amir's refusal to receive the deputation led to the outbreak of the Second Afghan War. A greater degree of success attended British efforts, and by the end of 1878 the amir had fled the country, after the capture of Kandahar and Jelalabad by the British forces. He *d.* in the following year at Maga-i-Sharif. His son Yákúb Khan succeeded him, and signed a treaty with the British at Gandamak. This agreement contained the following conditions: 1. A British representative to take up residence at Kabul. 2. The guarantee of British assistance in the event of collision with foreign powers. 3. A subsidy to be granted to the amir. 4. Kuram, Pishin, and the Sibi valleys to remain under British control, for the purposes of developing a frontier defence for India. A settlement followed, though of short duration, for, six months later, the amir's troops, in a state of revolt, surrounded the British residence. A bloody massacre was perpetrated in spite of a determined resistance. Punishment followed in the defeat of the Afghans by Sir F. (later Lord) Roberts at Charásia, and possession was taken of that city. Yákúb Khan abdicated, placing himself under British protection. Speedily fresh troubles arose in the rebellion of the tribes. The British were held up at Sherpur until General Gough relieved them. In 1880 the ex-amir's brother Ayub, filled with a spirit of righteous fanaticism, proclaimed a holy war (*ghaza*) upon the British. At Maiwand he completely defeated General Burrows. A further loss followed when Brooke was forced to retreat before the religious frenzy of Ayub, suffering heavy losses. Kandahar was now besieged. Sir F. Roberts, however, severely repulsed Ayub Khan and once again established British rule in Southern A. It was resolved now to evacuate Kandahar, whereupon Sirdar Shere Ali, perceiving his helplessness, withdrew to India. Meanwhile, learning of the British evacuation of Kandahar, Ayub once again advanced upon the city. It was not long in falling into his possession. The Amir Abdur Rahman, however, prompted by the loss, summoned sufficient determination to succeed in recapturing the town, in destroying the army of Ayub Khan, and in fixing once more his position as amir. In 1884 the demarcation of the northern Afghan boundary continued under British and Russian co-operation, in an atmosphere of contention and constant disagreement. By 1891 Amir Rahman had strengthened his position to a degree more considerable than the preceding years had known. A period of rigorous administration saw the imposition of increased taxes, the organisation of a standing army, and the destruction of the power enjoyed so long by the many neighbouring tribes. His death in 1901 brought to an end a reign wherein complete reform had taken place, though at the cost of cruel and harsh measures. Habibullah succeeded him.

He began his career with universal acclamation, and ensured that popular reception by his relations with outstanding tribes and the organisation of his army He arranged for representation of each tribe in a tribal council for the settlement of inter-tribe disputes. In his foreign policy he followed the example his father had set. In return for British assistance in the event of foreign aggression, he promised to abide by British advice referring to questions of external affairs. This agreement he faithfully observed, and those questions which arose from Russia's relations with bordering provinces he referred to India. Overtures made by the Indian Gov. were received

with coldness, and all attempts to alter the terms of the agreement met with little encouragement. True to the traditions of his race, all ventures that tended to increase the cordiality of his relations with India failed to arouse any response. It became necessary that he should have access to the highest Indian experts and authorities, and to that end a meeting was proposed between a British mission and the amir. A series of dilatory and hesitating replies indicated his attitude towards the movement. However, in a few months he finally gave his consent. No actual change occurred from the meeting, the only benefit that resulted being the more strongly binding nature of the previous arrangement of 1880. Later, however, a meeting was successfully convened between the viceroy and the amir, to the satisfaction of both sides. But, throughout all his dealings of a diplomatic nature the amir evinced a tendency to independence and a wish for practical isolation.

The Amir Habibullah Khan was assassinated in 1919. Thereupon his brother Nasrullah seized the reins of power, but was deposed by Amanullah, the third son of Habibullah. Amanullah's troops crossed the frontier of India in May 1919, but were speedily repelled by the British troops, who advanced to Dakka, thereby compelling the Amir to conclude peace (August), but with a recognition of Afghan independence. In 1921, a Treaty was signed at Kabul by which Great Britain recognised the internal and external independence of A., and A. accepted the then-existing frontier between India and A. subject to a slight adjustment near the Khyber. It was also ... ange diplo- ... luding con- ... Calcutta, ... other towns. By the same treaty A. is permitted to import free of duty such war material as may be necessary to her defence. In 1923, a Trade Convention was concluded, and though there is no exact information of trade statistics, ... e exports and ... a and A. are c... value of £1,00... dia being chief...

... and his queen paid a State visit to Europe, visiting Italy, France and Great Britain. Everywhere they were cordially received, and presents showered upon them, mainly with the object of securing concessions in A. and of furthering divers political interests. Amanullah manifested considerable diplomacy in promising much and buying little, his dominant idea being to westernise his kingdom and to give most, no doubt, to the country which should render him the greatest benefit in this direction. He also concluded treaties of good-will with Turkey and Persia, by which the different signatories agreed to adopt a conciliatory attitude towards each other in the event of disputes. On reaching his own country again, many reforms were put in train. Afghan students were sent to Europe to study modern methods of army administration and military training, political science and engineering, and a comprehensive programme of public works embracing railways and telegraphs and an aeroplane service was planned at enormous expense for so poor a state. But perhaps the most striking reform initiated was the emancipation of women through the zeal of Queen Souriyah, who, being a woman of Damascus, was not slow to appreciate the backward state of the women of her royal consort's country. European dress was also adopted by the King's council, even to the fam... Still more ... decrees of ... of titles o... ment of the powers of the religious leaders, together with a bold attempt to introduce cabinet government. It is not easy to say which of these drastic reforms caused the most unrest among the tribesmen, but the removal of the veil in public and the education of girls soon inflamed public opinion to danger point. The direct cause of the revolt which followed this westernising zeal, however, was the royal order to all tribesmen to become naturalised citizens of A., and under the lead of the Shinwari tribe, supported by the incensed Moslem priesthood, armed rebels were soon mustering for a general attack. The situation in Kabul became so critical, in spite of the initial defeat of the rebels by the king himself, that all European residents were evacuated by aeroplanes sent out from British India. Amanullah's position grew steadily worse during the autumn of 1928. His capital was isolated and severe damage done to numerous buildings. He removed his Court to Kandahar and, in a despairing effort to save his crown, deemed it advisable to recant his European doctrines by recalling the Afghan students and giving orders to foreign legations to leave the country. But it was too late, and in 1929 he abdicated in favour

of his elder brother Inyatullah. But when the new king abdicated in his turn, Amanullah rescinded his abdication. Meanwhile the rebel leader Bacha-i-Saquao, under the name of Habibullah Khan, had usurped control at Kabul. Amanullah met with no better fortune, and in May fled with his wife and brother to Bombay, whence they journeyed to Europe. In October Habubullah, defeated in his turn, fled from Kabul, which fell to Nadir Khan, former war minister under Amanullah, who later was elected king. This monarch has been duly recognised by the British Gov., and the position at present appears to be comparatively secure, assuming that the rumours of Amanullah's attempts to join hands with the Soviet are unfounded.

Afium Kara Hissar, or **Afiorim Kara Hissar** (Opium Black Castle), a tn. in Anatolia, Asia Minor, on the route between Smyrna and Armenia and Persia. It contains beautiful churches and mosques. Its chief trade is in opium, but it manufs. firearms, woollen and cotton goods, felts and tapestry. Pop. 20,000. In the Græco-Turkish War, 1921–22, the Greeks, heavily defeated in Sept. 1921, retired on Eskishehr and repulsed Turkish attacks at A. K. H. in Oct.

Afragola, a tn. near Naples, Italy, noted for its wine and its straw goods. Pop. 24,000.

Afranius, Lucius (*fl.* c. 100 B.C.), a Rom. comic poet, playwright, and orator, who was the first to give up imitation of the Gks. in depicting Rom. life. His extant works are only fragmentary, and have been collected by Otto Ribbeck in *Comicorum Romanorum Fragmenta*, 1898.

Africa is one of the five continents, and belongs to the 'Old World,' being connected with Asia by the Isthmus of Suez, and separated from Europe by the Mediterranean Sea. The name 'Africa' was first given by the Romans to their African provinces with the city of Carthage, and it has since been extended to the whole continent. Both Gk. and Rom. writers called this continent 'Libya,' and Herodotus (*b.* 484 B.C.) and Ptolemy (*fl.* A.D. 139) in their works give us information about this land. In the seventh century the Arabs were acquainted with the country S. of the Great Desert, and the Arab geographers, the chief of whom are Edrisi, Ibn Batuta, and John Leo (Leo Africanus), have left records which, though often vague and unsatisfactory, show a more extensive knowledge of A. than that possessed by the Gks. and Roms. In the fifteenth century the Portuguese made discoveries along the N.W. coast, reaching between 1467 and 1484 as far S. as Sierra Leone, Farnando Po, Cape St. Catherine, and the Congo. In 1487 Bartholomew Diaz discovered the Cape of Good Hope or, as he called it, the Cape of Storms; and in 1497 Vasco da Gama discovered the Cape route to India. The Portuguese soon made journeys into the interior, and during the sixteenth and seventeenth centuries settled along the E. coast. During the sixteenth century the Fr. sent ships to the R. Gambia, and during the end of the seventeenth and the beginning of the eighteenth centuries they opened up the country of the Senegal, estab. commercial factories, discovered Bambouk to be rich in gold, and obtained new information about the Niger and Timbuctoo. The Dutch, the Danes, and the Eng. then commenced to explore. Mungo Park made journeys in 1795, 1796, and 1805, discovering new land around Timbuctoo, and sailing down the Niger. At the beginning of the nineteenth century various discoveries were made by Tuckey, Peddie, Campbell, Bowdich, Mollien, Ritchie, Lyon, and Laing. In 1822 Denham and Clapperton set out from Tripoli and reached Lake Tchad; Laing and Caillé reached Timbuctoo; and Richard Lander reached the mouth of the Niger in November 1830. About the middle of the nineteenth century expeditions were made to Abyssinia, the upper Nile valley, and Northern A., and about the same time attention was turned to S. A. David Livingstone reached Lake Ngami, 1849, went northwards up the Zambesi, and explored the regions round Lakes Nyassa and Tanganyika from 1859 to 1873. Burton and Speke discovered Lake Tanganyika, 1857, and Speke discovered the southern part of Victoria Nyanza. In 1860 Speke and Grant went up the White Nile and reached Gondokoro, and Baker discovered Albert Nyanza. Barth, Gustav Nachtigal, and Schweinfurth explored E. Soudan from 1850 to 1870. Cameron made discoveries in the Congo basin, and Stanley, after exploring the regions around Lake Tanganyika, arrived at the mouth of the Congo in 1877. Serpa Pinto, Thomson, Johnston, Grenfell, Pogge, Wolf, and Wissmann made many discoveries during the latter part of the nineteenth century in the basins of the Nile and Congo. Northern A., especially the dist. between Morocco and Timbuctoo, has been explored by Oscar Lenz. Crogan and Sharp traversed A. from the Cape to Cairo in 1901.

Boundaries, Size, and Coast-line.—A.

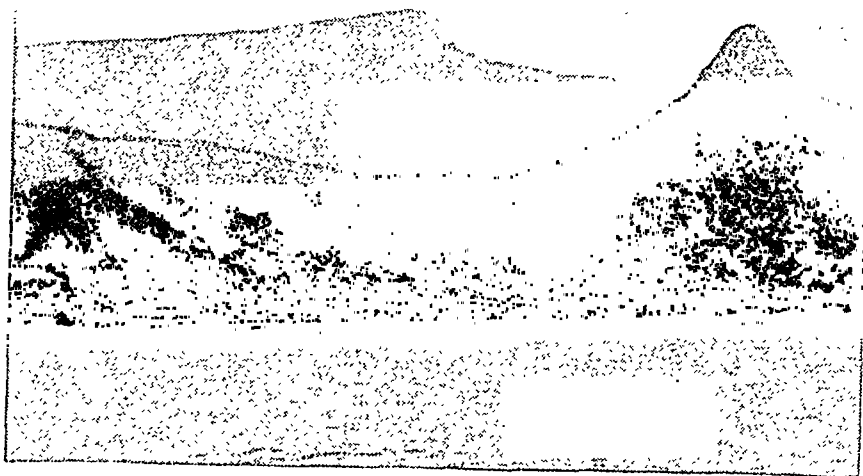
is bounded on the N. by the Mediterranean Sea, on the W. by the Atlantic Ocean, on the S. by the Indian Ocean, and on the E. by the Indian Ocean and the Red Sea. Its greatest length from N. to S. is 5000 m., and its breadth from Cape Verde to Ras Hafoon is 4650 m. Its area, including Madagascar and the other adjacent islands, is nearly 12,000,000 sq. m., or three times that of Europe. The coast-line is regular, with no deep seas, bays, or riv. estuaries of any size to afford climatic or commercial advantages; so that in proportion to its size A. has less coast-line than any other continent, its total length being about 16,000 m.

Islands.—A. has very few islands, and they are all small with the excep- ... which is *one of* ... orld. In the N. ... rtu- guese), the ... and Cape Verde ... Fernando Po ... Is. (Portuguese ... rtu- guese), and ... are four volcanic is. in the Gulf of Guinea. St. Helena and Ascension (British) are solitary rocks in the Atlantic. On the E. in the Indian Ocean are Madagascar (Fr.), the Mauritius (British), Bourbon or Réunion (Fr.), Seychelles, *Amirante*, ... Comoro, an ... tectorate); ... (British), a ... Perim and Dahlak.

Surface.—The continent is an enormous plateau with terraced tablelands rising one above the other, terminating in the rugged mts. of the E., where the Nile and the Congo take their rise. The interior plateau is bordered by mt. ranges which run parallel with the coast and descend in terraces to it. The Great Desert or Sahara is shut in between the Atlas Mts. on the N. and the Southern Plateau, and the Congo basin occupies the western part of the peninsula. ... 3, the E. Coast.—1. The Atlas Mts. occupy the northern portion between the sea and the Sahara, from Wady Daa to Cape Bon. The eastern portion, from 6000 to 8000 ft. high, consists of two parallel ranges enclosing a plateau where salt lakes called Shotts are found. The western portion, known as the Great Atlas of Morocco, has an average elevation of 10,000 ft., and the highest peaks are over 14,000 ft. high. 2. The W. Coast System consists of the Cameroon Mts., between 13,000 and 14,000 ft. high, and the highlands of Lower Guinea, known as the Kong Mts. 3. The *E. Coast* System, which is the most important, consists of: (*a*) The southern section containing the Drakenberg with Mt. aux Sources, 11,200 ft.; the Rand... 7500 ft.; and ... Compass-berg, ... In Cape Colony is the ... the Great Karoo. (*b*) the ... between the Zambesi and Abyssinia, containing the highest peaks in A. and the Great Lakes. Kilimanjaro, 19,500 ft., and Mt. Kenia, 18,000 ft., are extinct volcanic peaks. The ... near Lake Nyassa, ... the Ruwenzori ... of the Moon'), between Albert Nyanza and Albert Edward Nyanza, is from 16,000 to 20,000 ft. high; and Mt. Mfumbiro, between Albert Edward Nyanza and Victoria Nyanza, is 11,000 ft. high. (*c*) The Abyssinian System rises abruptly from the coast and gradually descends, and *contains* Ras Dashan, 15,000 ft., and Abba Yared, 15,000 ft.

Plains and Deserts.—There are two great deserts, the Sahara, the largest desert in the world, in the N., and the Kalahari, a sandy rainless region in the S. The Libyan and Nubian Deserts are really a continuation of the Sahara.

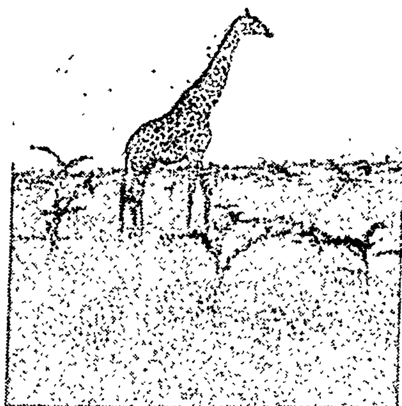
Rivers and Lakes.—Considering its size and compared with other continents A. has but few rivs., and her commercial prosperity has been greatly retarded by the want of navigable rivs. with good harbours. Most rivs. are impeded by cataracts. The most important are the Nile, Congo, Zambesi, and Niger. The Nile is of political, historical, and commercial importance, and its overflow is of vital importance to Egypt. The great lakes connected with the Nile are Victoria Nyanza, Albert Nyanza, and Albert Edward Nyanza. The Congo, which drains an equatorial rainy dist., has a constant water supply, and between Stanley Falls and Stanley Pool the riv. is navigable for 1000 m. Lake Tanganyika supplies the Congo with a considerable amount of water. The Zambesi is the *chief* riv. in the E., and though navigable in some parts, its course is impeded by cataracts and rapids. The Zambesi or Victoria Falls, the largest in the world, are situated on this riv. The Zambesi is connected with Lake Nyassa by the Shire. The Niger is of great *commercial* importance, being navigable almost entirely from its source to its mouth in the Gulf of Guinea. The Orange River is neither useful for navigation nor irrigation, but the Limpopo, with its



CAPE TOWN
(showing Table Mountain and Lion's Head)



VICTORIA FALLS



A GIRAFFE IN E. AFRICA

(Photos by Canadian Pacific)

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Islands.—A. has very few islands, and they are all small with the exception of Madagascar, which is one of the largest in the world. In the N. Atlantic are the Madeira Is. (Portuguese), the Canary Is. (Spanish), and Cape Verde Is. (Portuguese). Fernando Po (Spanish), Prince's Is. (Portuguese), St. Thomas (Portuguese), and Annobon (Spanish) are four volcanic is. in the Gulf of Guinea. St. Helena and Ascension (British) are solitary rocks in the Atlantic. On the E. in the Indian Ocean are Madagascar (Fr.), t [illegible]
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Mountains.—The mts. of A. may be divided into three distinct systems: 1, the Atlas; 2, the W. Coast, and 3, the E. Coast.—1. The Atlas Mts. occupy the northern portion between the sea and the Sahara, from Wady Daa to Cape Bon. The eastern portion, from 6000 to 8000 ft. high, consists of two parallel ranges enclosing a plateau where salt lakes called Shotts are found. The western portion, known as the Great Atlas of Morocco, has an average elevation of 10,000 ft., and the highest peaks are over 14,000 ft. high. 2. The W. Coast System consists of the Cameroon Mts., between 13,000 and 14,000 ft. high, and the highlands of Lower Guinea, known as the Kong Mts. 3. The E. Coast System, which is the most important, consists of: (*a*) The southern section containing the Drakenberg with Mt. aux Sources, 11,200 ft.; the Randberg, with Stritz-kop, 7500 ft.; and the Nieuwveld, with Compass-berg, 8000 ft. In Cape Colony is the enormous plateau called the Great Karoo. (*b*) the section between the Zambesi and Abyssinia, containing the highest peaks in A. and the Great Lakes. Kilimanjaro, 19,500 ft., and Mt. Kenia, 18,000 ft., are extinct volcanic peaks. The Livingstone Range, near Lake Nyassa, is 11,000 ft. high; the Ruwenzori Range ('Mountains of the Moon'), between Albert Nyanza and Albert Edward Nyanza, is from 16,000 to 20,000 ft. high; and Mt. Mfumbiro, between Albert Edward Nyanza and Victoria Nyanza, is 11,000 ft. high. (*c*) The Abyssinian System rises abruptly from the coast and gradually descends, and contains Ras Dashan, 15,000 ft., and Abba Yared, 15,000 ft.

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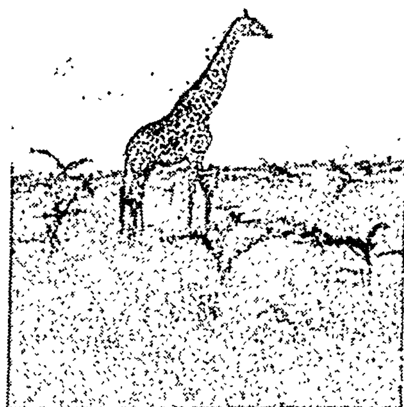
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mouth just N. of Delagoa Bay, is navigable for about 60 m. The Senegal, Gambia, and Ogoway flow into the Atlantic on the W., and provide navigable waterways for some distance from their mouths.

Climate.—Nearly three-fourths of the total area lies within the tropics, under the vertical rays of the sun, so that there is almost perpetual summer with definite seasons of rain and drought. The variations in the climate are caused by the prevailing winds and height. Ruwenzori and Kenia, almost on the equator, are covered with perpetual snow for 2000 or 3000 ft. downwards from their summits, and there is also perpetual snow on many peaks in Abyssinia. The sides of the mts. are in many cases very fertile, yielding different vegetation according to the height. The prevailing winds are from the N.E. and the S.E. The N.E. winds, having come across Asia, bring no rain to northern A. The S.E. winds bring moisture to the coast dists., but owing to the mts. it does not reach the interior, hence the Kalahari Desert. The region of the tropical rains extends from 18° N. lat. to 20° S. lat., where the vegetation is luxuriant and the soil productive except in the swamps near the coast.

Productions.—The vegetation varies in different parts according to the climate and soil. In the regions bordering on the Mediterranean the olive, fig, orange, and vine are found. In the Sahara the date-palm grows in the oases; but the vegetation of this dist. is very scanty. In the Lower Nile valley—the fertility of the soil of which depends on the overflow of the Nile—cotton, wheat, flax, rice, and maize are produced. The Soudan is a pastoral and agricultural region. Cattle are reared, and durrah and maize are cultivated. In the western dists. bordering on the coasts, and especially in Senegal and Gambia, the palm is found and palm oil is the chief article of export. The W. equatorial regions consist of dense forest with thick undergrowth, and here the chief productions are palm oil, ebony, ivory, rubber, and bananas. The chief product of Abyssinia is coffee. The eastern plateau produces millet, and the savannahs provide good pasture land. In the S. sheep, goats, and the ostrich are reared, wool, skins, and feathers being exported; and the vine, maize, sugar, and tobacco are cultivated. The fauna of A. is remarkable. The lion, hippopot...
elephant, rhi...
hyena, buff...
the forests.
large rivs., and the monkey is found all over the continent. The zebra and antelope are also common, the camel frequents the northern deserts, and the ostrich the southern deserts. Birds, reptiles, and insects abound in great varieties. Of the mineral products the most important are gold, diamonds, copper, coal, and iron. Gold is found in S. Rhodesia, the Transvaal, and the Gold Coast; diamonds at Kimberley; copper at O'okiep in Cape Colony; coal in Natal and Cape Colony; and iron in Algiers.

People and Population.—The pop. is estimated at 143,000,000. Some dists., such as the deserts and swamps, are almost entirely uninhabited. The most thickly populated regions are the Nile delta, the Lower Nile valley, and the basins of the Congo and Niger. The S. and extreme N. are not so thickly populated as these dists. In this continent are found many branches of the human race. 1. European settlers include Dutch, Portuguese, English, French, Spanish, Italians, Germans, and Turks, who occupy the extreme N. and the S.
2. Asiati...
Semites, ...
from Ar...
Nubia, a...
dered over the Sahara. The Semites also, from S.W. Asia, followed the Hamites and settled in the Mediterranean coasts, the western Sahara, and in Soudan. Their descendants are known as Berbers. Hindoos are found chiefly in the Transvaal. Tuaregs, a mixture of Berbers and Negroes, dwell in the Asben Mts. in the Sahara, and the Tibbus in the E. of the Sahara. 3. The original natives consist of Negroes, Hottentots, Bantus, Bushmen, and several dwarf tribes. The Negroes dwell mostly in the Senegal and Gambia dists., the Guinea coast, and Soudan. The Bantus — the most important types of which are the Zulus and Kafirs—occupy the southern or peninsular part of the continent. The Hottentots dwell in the S.W. coast dists.; the Bushmen in the W. of Cape Colony and in the Kalahari Desert. The inhab. of Madagascar, the Malagasy, are not an African stock, but a branch of the Malay family.

Religion.—...
religion of ...
Christianit...
and Abyssinia, and has been introduced in many parts by European missionaries. Many of the natives of the S., however, are still nature-worshippers, and believe in evil spirits and fetishism.

Social Cond...
of the nativ...
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and the people of the Soudan, the Nile valley, and Abyssinia are mostly agriculturists. In the Sahara and eastern Soudan are the Nomads. In the European settlements agriculture, sheep and ostrich farming, gold and diamond mining, are the chief occupations. Many people are also engaged on the plantations. Slavery, although being gradually discontinued under European influence, is still prevalent amongst the Arabs of the interior; and cannibalism is still common among some of the native tribes.

Political Divisions. — European nations who have settled in A. have gradually extended their dominions, until almost the whole continent has come under the influence of European states. The only states that are independent are Morocco, Abyssinia, and Liberia, but the first-named is a protectorate partly Fr. and partly Sp. The different divisions and the European states to whom they belong are :—

French.—Algeria, a large part of the Sahara and the Soudan, Tunis, Fr. Guinea, Senegal, the Ivory Coast, Dahomey, Wadai, Fr. Congo, the Fr. Somaliland Protectorate, Madagascar, with the Comoro Is. and Bourbon or Réunion Is. Area, 3,619,641 sq. m. Pop. 4,000,000.

British.—The Union of S. A. (consisting of the provs. of Natal, Cape of Good Hope, Orange Free State, and the Transvaal), Swaziland, Basutoland, Bechuanaland Protectorate, Northern and Southern Rhodesia, Nyasaland Protectorate, Uganda Protectorate, Kenya Colony and Protectorate, Somaliland, the Colony and Protectorate of Nigeria, Gold Coast, Sierra Leone, Gambia, and the Is.—Ascension, St. Helena, Mauritius, Seychelles, Socotra, and a few other small is. and dists. Area, 4,652,000 sq. m. Pop. estimated at about 50 millions.

Egypt (area, 383,000 sq. m. Pop. 14,166,756) and the Egyptian Soudan (area, 1,008,100 sq. m. Pop. 5,500,000) were, prior to 1922, under British and Egyptian administration.

Portuguese.—Madeira Is., Cape Verde Is., St. Thomas Is., Prince's Is., Portuguese Guinea, Portuguese W. A. and Portuguese E. A. Area, 794,294 sq. m. Pop. 8,399,101.

Spanish.—The Canary Is., the portion of the N.W. coast between Cape Blanco and Morocco Ceuta, and a few other ports on the N. coast, and Fernando Po and Annobon in the Gulf of Guinea. Area, 83,400 sq. m. Pop. 722,167.

German (before the Great War).—Togoland, the Cameroons, Ger. S.W.A. between Portuguese W.A. and the Orange R., and Ger. E.A. Area, 931,659 sq. m. Pop. 12,320,000.

Italian.—Tripoli, or Libya. Area, 399,000 sq. m. Pop. 1,000,000. Eritrea on the Red Sea Coast. Area, 64,000 sq. m. Pop. 510,000.

Belgian.—The Congo Free State is under the administration of Belgium. Area, 909,654 sq. m. Pop. 15,000,000.

Changes in Boundaries after the Great War.—The chief results of the War on the map of A. were the complete erasure of Germany from A., and the complete cancellation of all Turkish claims and interests in the continent. This followed from Germany's renunciation, under the treaty of Versailles, of all her rights and titles over her oversea possessions. Under the mandatory system created by the Covenant of the League of Nations Ger. S.W. Africa is now administered by the Union of S. Africa; Ger. E. Africa was transferred to Great Britain with the exception of the sultanates of Ruanda and Urundi, which were mandated to Belgium; the Cameroons (*q.v.*) and Togoland were divided between Great Britain and France, the greater part of Togoland, with the capital, Lome, and the railways, and practically the whole of the Cameroons as it stood before 1914 going to France. The British mandated sphere of about 13,000 sq. m. in Togoland is administered by the Gold Coast Government. The British sphere in the Cameroons is a strip of 33,700 sq. m., which is administered by the Nigerian Government. When the War broke out, Turkey had already lost all her African possessions, apart from retaining a few vested interests in Egypt and Libya. But under the Treaty of Sèvres she gave up all rights in or over Egypt, including her claim to tribute, and all rights in Libya; and she also recognised the Fr. protectorate in Morocco and Tunis to the fullest extent. Since this treaty arrangement Egypt has become an independent Sovereign State, the British protectorate having terminated in 1922, but the new Constitution, giving to Egypt an hereditary monarchy and representative government, does not affect Egypt's obligations to foreign states or the rights of foreigners acquired in Egypt by virtue of recognised treaties and customs. The British garrison at present in Egypt is there as an Army of Occupation in a country which during the War was under Turkish influences. Thus France and Great Britain dominate the field in A., and the elimination of Germany has removed the Power which pre-eminently influenced the 'scramble for A.' which before the war twice at least gave rise to serious international incidents. At the

present day there are only two nominally independent states in A. One is Abyssinia, whose independence was jointly guaranteed in 1906 by Great Britain, France, and Italy; the other is the Liberian Republic, which owes its independence to the intervention of the U.S.A.

Recent Exploration.—By the first decade of the twentieth century practically the whole surface of the continent had been explored except in the sandiest parts of the Sahara and Libyan deserts, the mountainous regions of Tibesti and the S. of Galaland. Probably there remain no new or startling fauna, certainly no new tribes to add to the sum-total of known African wonders. This, however, as researches in N. Rhodesia and Tunis show, does not preclude the discovery by archæologists of remains which may enrich the study of anthropology and geology. Indeed so high an authority as the late Sir Harry Johnston avers that the scientific study of A. past and present is only just commencing.

The Opening Up of Africa.—Missionary work in the wilds of N.W. Rhodesia has yielded much that is new in detail as to the customs of the Walamba tribe. It is probable that in this, as in many other parts of A., the natives' conception of men and spirits remains debasing and that the grossest vices and immorality are practised by them. Lying, stealing, gluttony, polygamy, and licentious debauchery were at their worst within the last eight years and the horrors of witchcraft, human sacrifice and live burials are or were still more or less prevalent here and there where the white man has not trod. (Con-ult *In Wild Rhodesia*, by H. and V. E. Masters, 1920.)

Much highly interesting information has been gleaned in recent years bout the Bushongo tribe by Mr. E. orday, of the Royal Anthropogical Institute, from his personal perience amongst this remarkable d hitherto (1925) unknown people. s theory is that the Bushongo ople, who are a Saharan tribe, grated originally from much ther north and settled by the kuru, Kasai, and Loange rivs. m their language, weapons, etc., eems that they are a kindred le with other tribes of the ngi-Tchad region such as the de (*On the Trail of the Bushongo*, on, 1925). In the field of ropology the most significant of the last few years was the g in 1925 in Taungs, Bechuanaof a human skull (*Australopithe*-ith affinities both to that of an nd of the Neanderthal man.

Much valuable information, too, h been gathered concerning the nume ous and little-known tribes in differe parts of the Sahara (see ANTHRO-POLOGY).

Communications.—The inland communications were very defectiv before the Great War. Except in th S. and in Egypt there were but few railways; and according to its size A. has but a small amount of navigable waterway. Inland communication is, therefore, carried on to a great extent by means of caravans. Camels are used in the N. and oxen in the S. as beasts of burden. Caravan routes cross the Sahara, the two chief being the Eastern Caravan Route from Tripoli to Lake Chad, and the Western Caravan Route from Tafilet in Morocco to Timbuctoo. Thus there is regular communication between the ports of the Niger and Lake Chad and the ports on the Mediterranean. With the help of a few railways and roads, there is natural water communication by riv. and by lake from the mouth of the Nile to the mouth of the Zambesi. The R. Niger and its tributary, the Benue, are important means of communication between the Soudan, Nigeria, and the Gulf of Guinea, being navigable for large riv. steamers. The Congo brings the produce of the Congo Free State to the Atlantic coast; and the Zambesi is navigable for a considerable part of its course, except where rapids and cataracts occur.

Railways.—There has long been a project for a railway from the Cape to Cairo, which is to run as far as possible through British territory. From the N. it has been constructed from Cairo along the Nile valley through Aswan, Dendoor, Korosko, Wady Halfa, Abu Hamed, Berber, Shendi, to some distance beyond Khartoum. From the S. it has been constructed from Cape Town through Worcester, Beaufort West, Hope Town, Kimberley, Vryburg, Mafeking, Palachwe, Bulawayo, to beyond the Zambesi. Cape Town and Port Elizabeth are connected by rail, and from Port Elizabeth a line runs through Colesberg, Bloemfontein, Kroonstad, Johannesburg, and Pretoria to Pietersburg. Other lines run from East London to Aliwal North and Springfontein; from Durban through Pietermaritzburg to Johannesburg; from Lorenzo Marquez to Pretoria; and from Mombasa to Port Florence on Victoria Nyanza. Many other railways have been constructed in British, Fr., and the former Ger. territories.

Railroad construction has proceeded rapidly since the pioneer work of Cecil Rhodes. Of other

than British railways the most important completed work prior to the Great War was the Ger. trunk line from Dar-es-Salaam to Lake Tanganyika (800 m.), opened in 1914. Fr. railroads were not increased to any great extent, but in 1915 a line was completed from the Red Sea coast to the heart of Abyssinia. At Lobito Bay in Portuguese West Africa the Benguela Railway has its terminus, a useful line giving the Katanga dist. of the Belgian Congo an outlet to the W. The Cape-to-Cairo all-rail route remains a dream, but the commercial mind has begun to appreciate that the more practical route is across the continent from E. to W. With the completion of the railway from the Upper Congo at Kabalo, to Albertville, on Lake Tanganyika, the first trans-Continental combined rail and steam route was an accomplished fact. There is also E. and W. rail communication, though less direct, between Walfisch and Delagoa Bays, a 20-m. connection linking up the S. African Union and the S.W. African railway systems. In S.A. in 1918 the line from Cape Town via Bulawayo and the Victoria Falls was extended to Bukama on the Lualala R. (Belgian Congo). In the Colonies new British railways are opening up and connecting the interior with the coast, though not for any great distance; there are now lines feeding the coal- and tin-mining dists. of Nigeria, a local line from Tabora, on Lake Tanganyika, which is projected to a terminus on Lake Victoria, and an extension of the Uganda Railway has been in process of construction since 1921. Communications in British E. Africa, or Kenya Colony, are in course of development, the British Government having approved in 1925 the proposal to raise loans up to £10,000,000 for the work.

Road construction proceeds apace, especially in the British W. African colonies, Uganda, and the Belgian Congo. Telegraphic communication in the course of the last fifteen years has been considerably extended, and the impulse given to wireless telegraphy by the War has naturally had its effect in A., where modern high-power wireless stations have sprung up in East A., South-west A., West A., Algiers, etc.

Commerce.—The Portuguese were the first to trade with A., and they had commercial relations with Upper and Lower Guinea; but the Dutch were the first to settle in the S. Here Huguenots came in the seventeenth century, but it was not until the end of the nineteenth century that trading relations began to exist between Europe and the interior, when British, Germans, French, Spanish, and Italians began to settle in A. There is a local traffic between France and Algiers, but otherwise most of the ocean maritime trade of A. is in the hands of the British.

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Africa, British East. (See BRITISH EAST AFRICA.)

Africa, German East, Campaign in (Great War). The conquest by the Allied forces of this Ger. colony was virtually completed on Nov. 27th, 1917, when the Mahenge Force under Colonel Tafel, comprising 3500 officers and other ranks, surrendered to General Van Deventer. The residue of the Ger. forces then took refuge in the adjoining Portuguese territory, but were gradually rounded up in the course of the next few months. The relief to the native pop. consequent on the final expulsion of the Germans may be gauged from the fact that the rule of the Ger. Government was so harsh that in the language of these subject races the Ger. Colonial Office officials were known as the 'Lords of the Twenty-five Lashes.' This epithet was by way of allusion to the brutal practice of whipping, the results of which practice were the subject of a White Paper issued by the British Government during the earlier stages of the war. In point of area Ger. E. A. is twice the size of Germany, and its conquest by the E. African Field Force under General Smuts and General Van Deventer

after a campaign of some twenty months was a triumph of determination and resourcefulness over conditions which offered terrible hardships. The country is one of almost impenetrable bush lands and desert, abounding in pestilential swamps, and crossed by mountain ranges. Never before in the history of warfare had operations on a large scale with modern artillery and weapons been conducted within a few degrees of the Equator, and seldom indeed has one consecutive series of operations taken place over so vast an area as extends from the Uganda Railway to the
[illegible] Lakes Kivu,
[illegible] sa to the Indian
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supplies were enormous, the absence of roads and water in the greater part of the country making the support and transport of large armies, marching ever further from their bases, an extremely harassing undertaking. In a measure these difficulties were common to both antagonists; but, on the other hand, the Ger. forces were not only more familiar with the country and consequently in a position to baffle pursuit for a considerable time, but in their retreat over a distance of not less than a thousand miles were approaching ever nearer to their supply bases and food depots, which, with a view to meeting every tactical emergency, they had established on a generous scale at various points. Finally, the bulk of the Ger. forces were negroes, hardened against diseases incidental to the climate and country, while the Allies, who were for ever groping blindly in the bushland after an indigenous and elusive foe, specially trained to the peculiar conditions of African bush warfare, comprised men from the temperate regions of S. Africa, Indian troops from the hills and troops from the United Kingdom. The distances covered by the troops, especially in the later stages of the campaign, would have been remarkable in any country; but carried out in the heart of Africa, under a scorching sun or in torrential storms, were wonderful feats of endurance. It is true that but few of the engagements attained to the dignity of battles, but the fighting was often continuous and always of the most determined character.

The first stage of the campaign, from August 1914 to March 1916, when General Smuts arrived, was the longest and most arduous of all, for if the privations were not perhaps so severe as in the later stages, yet the Allied troops, being very few in numbers, were always in peril. Not only were they set the task of defending a frontier line of some 600 m., but the military situation was one of ever-increasing anxiety, as on every sector the Ger. forces were in occupation of British territory, the opening attack on the enemy from the sea at Tanga having proved a more or less complete failure. Fortunately the Ger. command revealed a strange want of initiative in attack. The Ger. forces had between them and Mombasa no force other than a few Arabs under their picturesque chief Wavell, while their outpost at Taveta was a direct menace to the
[illegible]
for aggressive action as for defensive the campaign might well have taken an entirely different turn. This stage was characterised throughout by sporadic fighting, chiefly in the Tsavo region and in the neighbourhood of the Longido line and Ngururhan, [illegible]
gaged [illegible]
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At the close of these operations General Sir Michael Tighe, who had taken over the supreme command, made preparations for a general offensive, constructing a new railroad from Voi so as to link up Mombasa with the Ger. N. frontier. At the same time he ran a pipe-line from the well-watered hilly districts of Bura to the desert around Maktan. The first battle was fought at Salaita Hill, where the Ger. forces were strongly posted, but the issue was by no means satisfactory. In the early part of 1916, when the enemy's forces numbered about 2700 Europeans and 12,000 natives, General Smuts opened the second stage of the campaign with a brilliant attack near Taveta on the one vulnerable point in the enemy's mountain line. Two columns of cavalry moved N. and S. of Mt. Kilimanjaro in a wide, circling movement, and the enemy, thrown out of Taveta, fell back on the Latema ridge, where he counter-attacked, but was again defeated and fell back on Kahe, where he was outflanked by a [illegible]
Tanga. This a [illegible]
of the tide, for [illegible]
the rains having set in, sent patrols as far into the enemy's country as Kondo Irangi. So far, however, the E. territory had not been touched, and it was necessary to drive Kraut's army from the Pangani valley, so as to advance on the Central Railway. This, after many forced marches, was accomplished, but Kraut's force

escaped, and it was only after the lapse of two months that Deventer was in a position, having reorganised his river transport, to advance on the railway, General Smuts meanwhile forcing the passage of the Wami and isolating the chief town of the colony, Dar-es-Salaam. Following on this success, General Smuts overwhelmed the defensive system of the Uluguru Hills, driving the enemy as far S. as the Rufigi R., in the neighbourhood of which they took refuge during the rainy season. The third stage opened with the problem of dislodging the enemy from the valley of the Rufigi, a task which was accomplished by the S. African Infantry, while at the same time troops landed at Kilwa and elsewhere to drive the enemy from the coastal regions. Then followed a long and very disheartening period of campaigning through dearth of food, almost insurmountable transport difficulties and the ravages of malaria. About this time Lieut.-General Sir J. L. van Deventer became Commander-in-Chief in E. Africa, and thereafter conducted the campaign to its conclusion. By the end of August 1918 the enemy had been repulsed with considerable loss at Lioma and barely escaped from converging attacks E. of that town, General Deventer's troops being disposed around Lioma, at Malakotera, and Muanhupa, the last-named being in the heart of difficult and broken country. The Ger. commander, Lettow Vorbeck, after the most stubborn fighting in the whole campaign—in the Lindi and Kilwa dists. in the latter part of 1917—had retired across the Rovuma into Portuguese E. Africa with some few hundred white troops and about 2500 black troops. But in the autumn of 1918 it was clear that von Lettow Vorbeck was finding Portuguese E. Africa too hot for him and was again making for Ger. E. Africa, where at least he had the advantage of being able to operate independently of lines of communication. The Ger. force having made for the Songea area, General Hawthorn was detailed to get troops there ahead of the enemy. The 2nd/4th K.A.R. and the N. Rhodesian Police were landed at Mbamba Bay by the end of September, two companies of the former being just too late to bar the enemy's passage of the Rovuma E. of Bangalolo. The rest of the landing force, however, pushed on towards Songea, and after beating off a sharp attack by the enemy, followed him in his northward movement, the speed of the enemy's movements from the middle of August averaging some 18 m. a day, calling for corresponding exertions, in spite of climate and terrain, on the part of the pursuing force. The Ger. commander, who was now at New Utengule, seemed compelled to go either towards Itunda in the N. or Bismarckburg in the W. Contrary to expectation, he changed his plans, despite the vast and impassable swamps of Lake Rukwa, and marched further S., apparently with the object of attacking N.E. Rhodesia, in the hope of obtaining food and supplies. Early in November the enemy attacked Fife (which stands midway, near the frontier, between Lakes Tanganyika and Nyassa) in force, but was beaten off with loss by the N. Rhodesian Police. Hotly pursued from the N. by the 1st/4th K.A.R., he retreated towards Kayambi Mission, reaching Kasama on Nov. 8, German E. Africa being thus once more clear of the enemy. The next engagement of the campaign was fought near Kavembe, the 1st/4th K.A.R. having caught up with half the enemy force at that place. After a stiff engagement the enemy was driven from his position, but all further operations stopped shortly afterwards owing to the news of the signing of the Armistice. The last engagement was actually fought on Nov. 12 N. of Kasama, the interruption of the telegraph communications preventing General van Deventer from getting into touch with the Ger. commander before that date. On the morning of Nov. 14 the British terms, based on Clause 17 of the Armistice, were handed to General von Lettow Vorbeck, in accordance with which the latter formally surrendered at Abercorn on Nov. 25. 'In view of the gallant and prolonged resistance,' says General Van Deventer, 'maintained by the Ger. Force in E. Africa, I allowed General von Lettow Vorbeck and his officers to retain their swords, while the European rank and file were permitted to carry their arms as far as Dar-es-Salaam.' Elsewhere General Deventer states that 'the Germans rewarded their black troops by giving them a free hand in respect of loot and the treatment of women; but it nevertheless says much for the character of the Ger. commander that he was able to keep these men with him through four years of most strenuous campaigning.' There were occasions when atrocities were committed on the British wounded, and the prisoners, especially the Indians, were at times infamously treated. The Germans themselves, however, with rare exceptions, tried to stop the former, while the latter was the work of men far behind the firing line, and most of the perpetrators

were punished. It was impossible entirely to exonerate the Higher Ger. command with regard to these matters, but in justice it should be recorded that the fighting of the E. African campaign was on the whole clean ... chivalrous. Unde... the Peace Treat... renounced in fav... her rights and titles over her overseas possession, lost Ger. E. Africa, which is now administered by Britain as mandatory. (*See* TANGANYIKA TERRITORY.)

Africa, South-west. Bounded on N. by Portuguese W. Africa, W. by Atlantic Ocean, S. and E. by the Union of S. Africa and Bechuanaland Protectorate. The total area is about 312,000 sq. m. (excluding Caprivi Zipfel, which is under the Bechuanaland Protectorate), and Walfish Bay (375 sq. m.). Pop.: European 25,000 (estimated for 1926); natives, 208,300. These figures are only approximate, for a large part of the country is still uncivilised and no precise information is yet available as to the numbers of Bushmen in the N. The principal native race is the Ovambo (a Bantu race), and others are the Herreros and Hottentots. The Herreros are a pastoral race, but their tribal organisation was ruthlessly shattered by the Germans in the Herrero War. Under the S. African mandatory rule Reserves have been assigned for their occupation.

Physical features.—The coastal areas of the W. are barren, especially between the Orange and Ugab rivs. and towards the E. boundary, where a part of the Great Kalahari desert is included in South-west A. There are good grazing dists. in the E. but the country, as a whole, is poorly watered, only the Orange and Kunene rivs. having ... For the ... n wells and ... of the 'Kar... region.

History.—Germany annexed the country in 1881, but lost the colony in the Great War. The Union of S. Africa now administers the country as a mandatory under the League of Nations. The administration is vested in the Governor-General of the Union, whose powers are delegated to an administrator with legislative authority.

Commerce, Communications, etc.—Stock-raising is the chief industry, but there is some agric. activity in the less barren regions of the N. Diamonds form the staple product, and the stones, if small, are of good quality. Copper, tin and marble are also worked. The annual value of the exports (chiefly diamonds and copper) is about £2,500,000. The total length of the railway from the Cape, within South-west A. is about 1300 m., much of the extension having been carried out during the campaign of 1915. There is also a line of 100 m. linking up the diamond fields ne...

Great ... the beginning ... ampaign the Ger... seized Walfish Bay. Their forces, late in the campaign, were estimated at 5000 regulars and reservists, a high proportion of the white pop. of 13,000 being composed of well-trained reservists. Their total force was not large enough for operations in a colony of 320,000 sq. m. with a native pop. of 90,000, many of whom were still smarting under the memory of the Herrero War. Large stores of guns, aeroplanes and other military equipment had been accumulated in the hope of fitting out an accession of rebels from the South African Union. The Union forces under Botha and Smuts numbered at least 50,000, equally divided into British and Dutch, the mounted soldiers being chiefly Dutch. The hot desert waste which extends far inland opposes difficulties to an invading force, but the Union leaders were not only skilled in the type of warfare required, but boldly undertook long surprise desert marches and wide enveloping movements, while the Germans kept to their railways. The first objective was the wireless stations. In Sept. 1914 a Capetown force seized Luderitz Bay, and soon afterwards another force also landed in the Bay, but was held up in case it should be required to deal with De Wet's rebellion elsewhere. A third ... at Port Nolloth a... R. into the S. e... protectorate, bu... trayal of Maritz, who soon afterwards joined the rebels, was severely defeated. When the rebellion assumed serious proportions, General Botha took the field in person and in four months had suppressed the rebels, whose last stand was made on the Ger. border (Feb. 1915). Meanwhile a new invading force had reoccupied Walfish Bay and taken the port of Swakopmund (Jan.), which Botha thereafter used as his base, while Smuts led the forces operating to the S., which was soon swept clear of the enemy by detachments moving inland from Luderitz Bay. By April, after a stiff fight at Gibeon, the enemy had been driven entirely out of the S. part and General Botha issued a proclamation formally taking possession of it. It now remained to take Windhoek, the capital, where

the Germans had a powerful wireless station. But for these operations General Botha wanted increased rail communication from the Union. By June 1915 the railway had been extended nearly 200 m. beyond its previous limit, Prieska, and within a fortnight of its completion the campaign was over, Botha, moving inland from Swakopmund, seizing Windhoek in May. The enemy retreated along their own line to the N.E., hotly pursued by the mounted troops, who, accomplishing a wonderful desert journey, outflanked them and forced them to surrender (July). The campaign was a vindication of high military skill applied to special local conditions and a triumph of endurance by the troops. Under the Treaty of Versailles the colony was ceded to the Union of S. Africa, which administers the territory as a mandatory under the League of Nations.

Africander, or Afrikander, a person living in S. Africa descended from European parents settled there. The Africander-Bond, or the Bond party, was founded (1879) in Cape Colony by Hofmeyr, Du Toit, and others, and had as its object the furtherance of Africander or Dutch influence in S. Africa. From its object and personnel it followed naturally that it warmly sympathised with the Boer Republics in their war with England (1899–1902). After that war it changed its name to the South African Party. In the first parliament of the S. African Union this party, under the Het Volk (The People), secured a majority, and its leader, General Botha, became prime minister, and the chief A. leader against Generals Botha and Smuts was Hertzog, whose attitude in the Great War was equivocal. The suppression of the rebellion which took place during the war destroyed Afrikanderism as a force designed to secure an independent S. Africa.

Afrit, or Efreet, an evil genie in Mohammedan mythology.

Afterglow, the phenomenon of a broad arch of light, either whitish or rosy, which sometimes appears above the highest clouds after sunset, and is due to fine particles of dust which affect the white light. This phenomenon was widely observed in the red sunsets occasioned by the eruption in Krakatoa in 1883.

After-image, in psychology, the persistence of a sensation after the stimulus has been withdrawn. It may be positive, when the sensation continues throughout of the same quality though not of the same intensity, or negative, when a complementary quality presents itself upon the withdrawal of the stimulus. The latter type is chiefly associated with the sense of sight; after looking at a patch of colour and shutting the eyes or fixing them elsewhere, a patch of the same apparent size and form, but of complementary colour, appears. Thus red gives a green A., yellow a blue one, and *vice versa*. It is suggested that the second image is due to the exhaustion of the sensory powers connected with the first colour and a kind of sympathetic excitation of the elements concerned with the second colour during the process of repair.

After-math is the grass which grows after the hay has been made. It is sometimes called latter-math, rowen, or rowett; and when left long on the ground it is known in some parts as fogg. It provides food for cows and sheep, but is bad for horses. The word is now used metaphorically for any sequence or consequent event.

Afzelius, Adam (1750–1837), a Swedish botanist, became demonstrator in botany at Upsala 1785, and professor of medicine 1812. He explored Guinea 1792, was secretary of the Swedish Legation in London 1794, and wrote sev. works on natural history.

Afzelius, Arvid August (1785–1871), a Swedish writer and historian. He was the author of *Den Sista Falkengen*, a drama, and a history of Sweden up to the death of Charles XII.; ed. popular Swedish songs; and trans. into modern Swedish the old legends Edda and Saga.

Aga, a word signifying lord, said to be of Tartar origin. The Turks use it for chiefs of the janissaries, and commanders of artillery, cavalry, and infantry. It is also used towards any person of exalted position.

Agades, a one time important city of Central Africa. To-day it is the centre of nearly all the most important caravan routes. It is the cap. of Asben, S. of the Sahara, and is situated on the edge of a plateau.

Agadir, a Moroccan tn. It was once an important seaport owing to its situation at the mouth of the Sus, being the most southerly maritime tn. in Morocco. The revolution of 1773, and the subsequent rise of Mogador, lessened its importance. In August 1911 the A. Incident, as it was known, nearly precipitated a European war on a large scale. The incident arose as follows. The treaty of Algeciras (*q.v.*), concluded in 1906, to which all the great powers, including Germany, were signatories, and in which France and Spain were entrusted with the task of preserving order in disturbed Morocco, was supposed to have settled the Moroccan question, but the sudden appear-

ance off A. of the Ger. gunboat, the *Panther* (replaced later by cruiser *Berlin*), and the demand of the Ger. Kaiser for 'a place in the sun,' precipitated a feeling of exasperation in France, which, had it eventuated in war, would have inevitably embroiled England. The prolonged negotiations or 'conversations' between the two countries resulted in Germany agreeing to forgo her claims in respect to Morocco, in exchange for which certain portions of Fr. Congo were ceded to her. Pop. 2500.

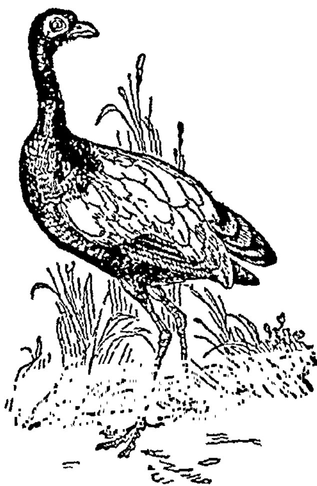
Agalmatolite (Gk. ἄγαλμα, ornament, λίθος, stone), silicate to hydrated aluminium, grey to pale green and red, which is used in China in the sculpture of small statues and various other objects.

Agama, a genus of lizards of the family Agamidæ (*q.v.*), native to Africa and India. It is of sombre colour, has a triangular head, conical tail covered with scales, is capable of inflating the skin, and inhabits ruins, stony and rocky places.

Agamedes, the legendary son of Erginus, King of Trophonius. He and his brother were regarded as supernaturally wonderful architects. They built a treasure house for Hyrieus, stealing the treasure by means of a loosened brick. On discovery of A., his brother cut off his head and fled, to be swallowed up by an earthquake. They built a temple for Apollo, according to another version, and on asking for a reward were promised one within seven days. On the seventh day they died.

Agamemnon was the son of Plisthenes and Aërope or Eriphyle, and grandson of Atreus, King of Mycenæ. According to Homer he was a son of Atreus and grandson of Pelops. After the murder of Atreus, Agamemnon and his brother Menelaus went to Sparta, where Agamemnon married Clytemnestra, sister of Helen. He became King of Mycenæ, and commander-in-chief of the Gks. in the siege of Troy. At Aulis, where the army and fleet assembled, Agamemnon killed the favourite stag of Artemis (Diana), for which fact a pestilence and calm were produced, causing a delay in the start. To avert the anger of the gods, Agamemnon consented to sacrifice his daughter Iphigenia, but she was carried off by Artemis, and another victim was selected. The army then sailed to Troy, and the quarrel between Agamemnon and Achilles is one of the most memorable events of the siege of Troy. When Troy was taken Agamemnon received Cassandra, the daughter of Priam, as his prize; and on his return home he was murdered by Ægisthus and Clytemnestra, his wife. His murder was avenged by his son Orestes, who killed Ægisthus and Clytemnestra. The Gk. tragedians Æschylus, Sophocles, and Euripides make these legends the subject of many of their plays.

Agami, the native name for the trumpeters of tropical S. America, to which Latham has given the name of *Psophia crepitans*. It belongs to the Gruiformes, and is closely allied to the cranes. It is a beautiful, many-coloured bird, gregarious, easily



AGAMI

tamed; it chooses mts. and upland forests for its home, and feeds on insects and fruit. The eggs, ten to sixteen, are laid in a scratched-out hole, the young are covered with down, and the mature bird is about the size of a pheasant. Its name is obtained from its trumpet-like cry.

Agamidæ (Gk. ἀ, without, γάμος, marriage, εἶδος, form), a family of saurian reptiles, or lizards, which have the agama for its type. It includes the *Chlamydosaurus* of Australia, which runs on its hind legs and has a curious frill on each side of its neck; the *Draco*, or flying dragon, common to Java; the *Moloch*, an Australian lizard, whose body is covered with large spikes; the *Calotes* of India, which changes its colour.

Agana, or San Ignacio de Agana, fortified cap. of Guam, Ladrones Is. Its port is San Luis do Apra. Pop. 6000.

Aganippe is a celebrated fountain in Bœotia. It is situated at the foot

of Mt. Helicon. The Permessus receives it. The fountain is held to be sacred to the Muses, who are named Aganippes from their association with it.

Agapæ, from the Gk. word 'ἀγάπη, meaning 'love,' signifies 'love-feasts.' They were founded in connection with the Lord's Supper. The spirit of charity which is responsible for the name of the function pervaded the banquet, the rich supplying food to which the poor were invited. For a time the A. and the Lord's Supper were celebrated together during the evening, but the persecution of the Christians compelled them surreptitiously to observe them at separate times, often before dawn. Subsequently a formal separation was made. Since the third century the banquets deteriorated in character, and the clergy were ultimately forbidden to take part in them. Owing to the extreme freedom from moral restraint which marked the proceedings, the whole ceremony was banned by the Church.

Agapanthus (Gk. ἀγάπη, love, ἀνθός, flower), a genus of African plants belonging to the Liliaceæ. *A. umbellatus* is a common garden flower.

Agapemone, a body of religious zealots founded in 1859 by Henry James Brown, formerly a clergyman of the Church of England. He proclaimed himself the 'Beloved,' and formed a sect whose settlement at Spaxton is called 'The Abode of Love.' His practice of marrying spiritual wives, who bore children to him, aroused a storm of obloquy. Their church was named 'the Ark of the Covenant.'

Agapetæ (from Gk. ἀγαπητός, beloved), virgins of the early Church who were associated with bishops, priests, and deacons, being bound to these celibates by spiritual love and attending to their material needs. Originally a beautiful institution, it was later abused, and consequently was suppressed by the Lateran Council of 1139. It was denounced also by several councils of the fourth century, by St. Jerome, St. Chrysostom, and the Emperor Honorius.

Agapetus I., Pope of Rome from 535 to 536, assisted in the establishment of a library of ecclesiastical books at Rome and deposed Anthimus, the patriarch of Constantinople. He *d.* at Constantinople on a mission of Theodatus, King of the Goths. The Roman Catholic Church celebrates his festival on Sept. 20, the Gks. on April 22.

Agapetus II., a Rom. by birth, pope from 946 to 955, appealed to Otto the Great of Germany against Berenger II., King of Italy, and attempted to free Rome and the papacy from degradation.

Agaphite, *see* TURQUOISE.

Agar, an Indian tn. situated in Gwalior. It lies in a plain with an elevation of 1598 ft. above sea-level. Its pop. is estimated at 30,000.

Agar-agar, otherwise known as Bengal or Japan isinglass. It consists of slices of the dried stem of seaweed. It is similar to gelatine, though it requires more heat to liquefy it after it has once assumed jelly form. Its principal use is as an artificial culture-medium for bacteria.

Agardh, Karl Adolf, a Swedish botanist, *b.* in 1785 at Lund. He became professor of botany there in 1812. Later he entered the Church, becoming bishop in 1859. He wrote voluminously upon the algæ, and on these great works our present knowledge of that plant is based. His son, Jacob Georg, succeeded him in the professorial chair (1854–79), contributing further revelations concerning the algæ.

Agaricia (Gk. ἀγαρικόν, mushroom), a genus of corals which resemble mushrooms, found in warm seas. They belong to the order Madreporaria, family Fungidæ.

Agaricus is a genus of fungi, of the sub-class Basidiomycetes, which comprises the mushrooms. It contains numerous species, some edible and some poisonous; among the former are *A. campestris*, the common mushroom; *A. pratensis*, the fairy ring mushroom; and *A. Georgii*, a large mushroom, while the latter includes *A. muscarius*, fly agaric, and *A. voiosus*. Plants of this genus grow on rocks, heaths, meadows, and decaying vegetable matter over the whole of Europe; *A. melleus* is most destructive to timber.

Agasias, a Gk. sculptor of Ephesus of the first century B.C. The statue called 'The Borghese Gladiator,' now in the Louvre, was his work.

Agassiz, Jean Louis Rodolphe (1807–73), celebrated naturalist, *b.* at Motier in Switzerland. He was educated first at home, and afterwards at the academy of Lausanne. He adopted medicine as a profession, studying at Zurich, Heidelberg, and Munich. In 1829 he took the degree of doctor of philosophy, and in the following year that of doctor of medicine. From that time he gave his energies to the study of ichthyology, and became the most eminent authority on the subject. He was asked, previous to graduating, to complete a history of the fresh-water fish of Brazil, which had been commenced by Spyx, who died while on the work. His brilliant success earned recognition from Cuvier, who

became his friend. In 1831 he accepted a professorship at Neuchâtel. He gained the Wollaston prize of London in 1834 by the publication of his *Researches on the Fossil-fishes.* Two years later he began a study of the glaciers of the Alps, expressing his views in the *Études sur les glaciers* and his *Système Glaciaine.* Previously he had written a *Natural History of the Freshwater Fishes of Central Europe.* In 1840 he founded an observatory on the Alps, and soon after embarked on a lecture tour in America, expounding his theories on the 'Plan of the Creation,' a series of lectures which met with instantaneous success. In 1848 he was appointed to the chair of Natural History at Harvard, and made expeditions of a scientific nature to L. Superior. Distinction after distinction followed, and he had to decline invitations from Paris and Zurich to accept professorships. He was appointed professor of zoology and geology at Harvard, Cambridge, Mass., U.S.A. Incessant work had meanwhile undermined his health, and a holiday, afterwards an organised scientific expedition, to Brazil was arranged. He *d.* in 1873 at Cambridge while engaged on the compilation of *Contributions to the Natural History of the United States.*

His son Alexander (1835–1910) was *b.* at Neuchâtel, and graduated at Harvard in 1855, studying chemistry and engineering. In 1859 he became an assistant in the United States Coast Survey, taking a great interest in mining. Incidentally he amassed a fortune from some copper shares which he held. He made a collection of Peruvian antiquities for the Harvard museum, and became its curator. Among his other interests river dredging occupied a large place. His works include a *Review of the Echini, Seaside Studies in Natural History,* and *Marine Animals of Massachusetts Bay.*

Agassiz Association, a natural history society founded in America by Harlan H. Ballard in 1875, which derived its name from that of the famous naturalist, Louis Agassiz.

Agastya, a Brahman saint, who is supposed to have been the founder of Tamil literature, and who is said yet to dwell as a *yogi* on the peak of Agastyamalai, a hill in Travancore. The construction of the pond called Vishnu Pushkarni Tirth in Bombay is accredited to him.

Agate, a mineral comprising all the many forms of silica, chiefly chalcedony. Most A. exist in rounded nodules or in veins in trap rocks. Among the numerous kinds of A. are the cornelian, amethyst, quartz, jasper, opal, and flint. The st are easy to polish and are much for ornamentation. They are bably formed by deposits of w containing silica in lava when cous. The slow movement of lava explains the drawn-out el gated shape of A., and on accou of this almond shape, the na amygdales has been applied to the When depositions have not occurr sufficiently to fill the hollow in t lava, the A. is hollow. A conside able industry in agate-working carried on in Germany around Obe stein. The dist. is rich in amygda loidal melaphyre. At the presen day, however, the A. themselves ar imported from Brazil. Naturally unattractive, As. are artificially stained, an art which is of ancient origin. The colorations are many, the chief being dark brown, red, blue, green, and yellow, while the appearance of others gives rise to the names star-agates, moss-agates, and clouded agates. Many are found in Scotland under the name of 'Scotch pebbles.' Besides ornamentation, As. are used in the making of knife-edge fulcrums for delicate balances, and for the manufacture of small pestles and mortars. Some of the finest As. come from Ontario, a dist. on the edge of L. Ontario being called Agate Bay. Another variety is that manufactured from wood obtained from the silicified forests of Arizona. India, New South Wales, Queensland, and Africa also produce As.

Agatha, St., the patron saint of Catania, Sicily. According to a legend she was a Sicilian noblewoman of great beauty, who refused the love of the Roman prefect. She was sentenced to be burnt alive, but at the application of fire to the stake an earthquake occurred. She *d.* in prison, and was numbered among the Roman Catholic saints. Her festival day is Feb. 5.

Agatharchides, or **Agatharchus,** was a native of Cnidus, and lived contemporary with Ptolemy Philometor (181–146 B.C.). He is celebrated as a Gk. historian and geographer. His works include a treatise on Asia, Europe, and the Red Sea. Preserved by Photius are interesting and valuable extracts from this last work. Photius commends the style of his writings. The description of the Red Sea was modelled upon a plan adopted by Thucydides.

Agatharchus, an Athenian painter of the fifth century B.C. Vitruvius says he was the first painter to execute scene-painting, but his only work in this direction was the front of a stage building which could be used, and was, on all occasions. He was seized

by Alcibiades and compelled to paint the interior of his house, an event which proves the popularity of the decorative painting of rooms.

Agathemerus, a Gk. geographer who lived in the third century A.D., and wrote in the vernacular a *Compendium of Geography*, an ed. of which was pub. in 1703 at Oxford.

Agathias (A.D. 536–82), a Gk. poet and historian of Æolis. He studied law, and practised in the courts of Constantinople. Literature, however, became his favourite pursuit. He wrote several short love-poems called *Diaphniaca*, and compiled an *Anthology of Epigrams*. He wrote a history of his own times in five volumes, and is the chief authority on the history of that period.

Agathis, a genus of Coniferæ with broad, lance-shaped, leathery leaves, native of the E. Indies and Australia; the resin makes varnish. *A. Dammara* is the dammar pine, *A. Australis* the kawrie or cowrie pine.

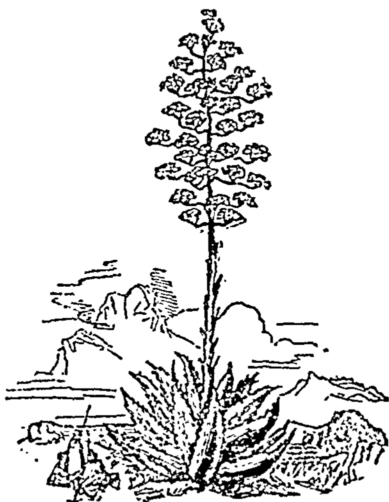
Agathocles (361–289 B.C.), known as the tyrant of Syracuse, was *b.* at Thermæ Himeræ in Sicily. His father was a potter, and Agathocles was put to the same trade. After learning the business he joined the army. In 333 he married the widow of his patron, Damas, a distinguished and wealthy citizen. He was banished from Syracuse for endeavouring to overthrow the oligarchy. In 317 he returned at the head of an army of mercenaries, and after his triumph he made a solemn oath to fulfil the ideals of the democratic institution now raised by him. A wholesale massacre was perpetrated of over 1000 citizens who resisted his authority. He made himself master, however, and, with the aid of a strong army and a powerful fleet, succeeded in conquering nearly the whole of Sicily. He now engaged in a war with Carthaginians, and was repulsed by them, till in 310 he was besieged in Syracuse. With an intrepidity characteristic of his methods, he courageously broke through their lines and attacked them in their own country. After a series of victories he was defeated, and abandoning his army to the mercies of the Carthaginians, fled secretly to Sicily. Peace with Carthage followed, and A. had himself proclaimed King of Sicily, and ruled with a firmness that earned him his name of tyrant. Until his death he displayed consistently extraordinary energy in whatever he strove to acquire, and was, in fact, meditating a fresh attack on Carthage when his death occurred. Ill health and the turbulence occasioned by the revolt of his grandson harassed his last days. Some authorities aver that he *d.* poisoned by his grandson Archagathus, while others state that he met his death naturally. Although he was forced to use cruelty in order to gain his ends, he cannot be said to have possessed a cruel disposition, and if he did little else, he proved without a doubt his born qualities as a leader of mercenaries.

Agathodæmon, a map designer of Alexandria who lived probably about the second century A.D. Ptolemy's geography contains in the MS. twenty-seven maps said to have been executed by A.

Agathodæmon, in Gk. mythology, a spirit of good fortune attendant particularly upon corn-fields and vineyards. Wine was drunk in his honour after every meal.

Agathon (448–400 B.C.), a poet of Athens famous for his tragedies. He owes most of his recognition to mention of him by Aristotle and Plato, the latter of whom wrote an account of a banquet given in honour of A., who had won a prize for tragic verse. Aristotle remarks upon the originality of his plots, the custom being, at the time, to borrow them from mythology.

Agave, a genus of plants belonging to the order Amaryllidaceæ, found mostly in Mexico. It somewhat resembles the aloe, and on that



AGAVE

account is often confused with it. Its beauty is remarkable. The best known species is the *A. Americana*. The plant grows to a height of 24–36 ft. Its roots possess detergent qualities, and are therefore used in large quantities for washing purposes.

Agde, a tn. on the Mediterranean coast in the prov. of Hérault, France. It is situated at the mouth of a riv., and has a considerable trade. Pop. 9000.

Age, in common law, at which a marriage is valid is twelve for a girl and fourteen for a boy. In 1929 an Act was passed raising this age to 16 years. The age which gives the privileges of an adult, and at which a person ceases to be an 'infant' in the eyes of the law, is twenty-one; the computation of these years is curious, for the day of birth is included and fractions of a day are unconsidered, so that a person may attain his majority nearly two days before his twenty-first birthday. The canonical age in the Roman Catholic Church is twenty-two for a sub-deacon, twenty-three for a deacon, twenty-five for a priest, thirty for a bishop. In the Anglican Church a man may become a deacon at twenty-three and a priest at twenty-four.

Age of Animals is difficult of determination, as it can be studied only in creatures in captivity, the unnatural conditions tending to shorten life considerably. Among the low forms of life a sea-anemone (*Actinia mesembryanthemum*) lived in captivity from 1828 to 1887 in the Botanical Gardens of Edinburgh, while a gastropod, *Tridacna gigas*, lived for a century; oysters and edible snails exist for about four years, while crabs can attain fifty years. Insects frequently die after a few hours or months, though the larva may have endured for sev. years. Lord Avebury kept an ant once for fifteen years; among bees the workers die soon, while the queen may reign for five seasons. Fish are usually devoured by larger species, but the more ferocious sometimes survive for an enormous period, a pike having been known to live for 267 and a carp for 200 years. Tortoises are said to exist for two centuries, while crocodiles exist for one; frogs die sooner than toads, which may live for thirty-six years.

Fish and reptiles are longer lived than birds and mammals. Small birds, such as sparrows and canaries, average about fifteen years, though parrots and swans may live for eighty, eagles and falcons for 100 years. Prolific animals are usually short-lived, swine seldom passing twenty years; large rodents, such as hares and rabbits, ten years; small rodents, such as rats and mice, five years. Among domestic animals, cats may age twelve to twenty-five, dogs sixteen to eighteen, horses and asses fifteen to thirty, cattle twenty-five to thirty, sheep and goats twelve to fourteen, deer ten to fifteen. Wild animals, such as the elephant, the hippopotamus, cannot be fairly judged in captivity, but under such a condition they have attained thirty-five years. Monkeys soon die when in this cold climate, and lions do not here reach their estimated thirty years.

The determination of the age of domestic animals is usually accomplished by noting their dentition. In sheep and goats the incisors appear during the first month, the first permanent molars by the sixth month, the milk-teeth fall at the age of two years, the true molars are complete in the fifth year. The milk-teeth of a dog come out between the third and fourth month, and the animal ceases to be a puppy at the ninth month. In horses the front incisors appear at the end of eight days, the middle at the end of five weeks, the back between the sixth and eighth month. They show signs of wear in order of appearance; at two to two and a half the front teeth fall and are replaced; at three and a half to four, the middle teeth, and at four and a half to five the back incisors. At six, seven, and eight respectively, the front, middle, and back teeth decay. In cattle both dentition and the rings on the horns indicate age, the first ring appearing at the age of three. The age of a stag can be ascertained approximately by the branches of the antlers up to the seventh year, but the oldest stag never has more than ten or twelve branches. *See* G. L. L. Buffon's *Histoire Naturelle*, 1749; Sir E. Ray Lankester's *Comparative Longevity in Man and the Lower Animals*, 1870.

Age of Discretion in Law is the time at which an infant is supposed to have attained sufficient understanding to judge of the morality of his actions. In criminal law an infant under seven is not held guilty of felony, a boy under fourteen cannot be guilty of carnal knowledge of a girl under thirteen years—though he may be convicted of assault—and it is a misdemeanour for one over sixteen years of age to ill-treat a child under sixteen who is in his charge.

Age in Physiology is divided into five periods of development and decay in human-kind—infancy, which extends to the end of the seventh year, childhood to the fourteenth, adolescence in males and females varies, but averages to about the twenty-first year, adult life to about fifty years, and after that period comes old age. The limits of human existence are unknown, but Thomas Parr ('Old Parr'), the oldest known Englishman, whose dates are not properly authenticated, is said to have died at the age of 153. Cases of per-

sons attaining a century of existence are of common occurrence, and the Hon. Katherine Plunket, Ballymascanlon, Co. Louth, Ireland, was 110 years in Nov. 1930.

Age of Trees may be computed by cutting a section of the stem and counting the number of concentric annual rings. These rings are formed by the difference in constitution of the wood in autumn and spring, the latest-formed xylem-bundles in a year being much smaller than those of the spring. The oak, elm, and ash show this difference, but it is not so clear in such trees as the beech and lime. Many trees attain to a great age, *e.g.* the oak, which reaches maturity between 120 and 200 years, and of which sev. examples are known to be 1000 years of age. Many yews are quite three centuries old, while the Scotch fir (*Pinus sylvestris*) has frequently weathered 400 years.

Agen, a city in S.W. France, and cap. of Lot-et-Garonne. The tn. is old and presents a depressing appearance. It carries on a trade in woollen and linen goods, and is an important railway centre. Jasmin, the poet, was *b.* there. Pop. 23,391.

Ageniosus (Gk. ἀ, without, γένειον, the part of the face covered by the beard) is a S. American fish belonging to the Siluridæ, or cat-fish, of the order Amiodei. They are characterised by the absence of a 'beard.'

Agent. An A. is one who is authorised by another to do acts for him and in his name, the person who authorises him being called the Principal or Constituent. There are many kinds of As., public and private, and they are known by many names, such as broker, bailiff, factor, ambassador, consul, etc., and the title of Agent-General is borne by many British colonial officials who represent the self-governing colonies in the home country. For most transactions other than those of minor importance it is usual for an A. to receive his appointment in writing, and an A. cannot bind his principal by deed otherwise than by a deed. The granting of such instructions is called the granting of 'power of attorney.' An A. acting under a commission *Del credere*, *i.e.* undertaking to be surety to his principal for the solvency of his principal's customers, is, in these customers' default, held accountable for debt, but in all other cases he is not liable. As a general rule the act of an A. is considered as an act of the principal, and the principal is in general liable for damage occasioned to third persons by the negligence or unskilfulness of his A.

Ages of the World, periods into which the history of the world is divided, each period being marked by some special feature. The idea originated amongst the Gks., and in the works of Hesiod five periods are mentioned: 1. The Golden A., when Saturn reigned, was a time of perfect innocence and happiness, without work. 2. The Silver A., when Jupiter reigned, was a time of godlessness, when troubles and labour commenced. 3. The Brazen A., when Neptune reigned, in which war, violence, and lawlessness prevailed. 4. The Heroic A., which was an improvement on the Silver and Brazen As. 5. The Iron A., when Pluto reigned and Hesiod himself lived, was the most miserable and wicked of all, for virtue had gone out of the world. Ovid, in his *Metamorphoses*, mentions the Golden, Silver, Brazen, and Iron As. European history has also been divided into periods, as: The Middle As., or the period after the fall of Rome until the fifteenth and sixteenth centuries, which were marked by the Reformation and the discovery of America. The Dark As., a period marked by the decline of classical learning and civilisation, extended from the inroads of the barbarians into Europe until the time of the Renaissance. It is also common to speak of such periods as the Homeric A., the Augustan A., and the Elizabethan A.; and also the Stone A. and the Bronze A.

Aggershuus, one of the divs. of Norway. It is better known as Christiania.

Agglomerate consists of a large mass of blocks or bombs of all sizes and shapes. It is of volcanic origin, and is frequently found in the necks of the craters of ancient volcanoes. These blocks sometimes consist of igneous rocks, sometimes of sedimentary rocks, and sometimes of both.

Agglutinative Languages are those languages which have long compound words, consisting of the principal word and the qualifying words, and are distinct from the 'inflectional' languages. The principal A. L. are the Mongolian, Turkish, Finnish, Hungarian, N. American, and the Dravidian (Tamil and Telugu, etc.) in Southern India.

Aghrim, or Aughrim, a vil. in the co. of Galway, Ireland. It is famous historically on account of the victory of the forces of William III. under Ginkell over the Irish and Fr. forces of James II. under St. Ruth. St. Ruth was killed. Pop. 204.

Agillochum. *See* ALOES WOOD.

Agincourt, a vil. of N. France, situated in the partition of Pas-de-Calais. It owes its notoriety to the famous battle fought there between Henry V.

of England and the Fr. The Fr. possessed overwhelming numbers, but the cumbersome armour with which they were covered and the muddy nature of the intervening ground, due to heavy rains, nullified their practical superiority. On Oct. 25, 1415, the armies faced each other. A pause followed, during which each expected the other's attack. At length Henry's archers opened the assault with dense flights of arrows. The Fr. replied with a charge. Fortunately for the Eng., the condition of the ground caused considerable confusion among the cavalry, who now found the greatest difficulty in extricating themselves from the clinging mud. They provided an admirable target for the Eng. archers, who proved themselves worthy of the reliance placed upon them. *A melée* followed, during which the Fr. suffered appalling loss of life, eventually yielding over 1000 prisoners of war, among whom was the Duke of Orleans (in literature Charles d'Orleans). The slain, lying in places three and four deep, included the Constable, three dukes, five counts, and over ninety barons. While the Eng. losses are estimated at a few hundreds, the wholesale slaughter of the Fr. resulted in no fewer than 10,000 dead.

Agio (It.), a term denoting difference between (i.) actual and face value of money; (ii.) the metallic moneys of different countries; also appreciation or depreciation from fixed rates of exchange.

Agira, tn. of Catania, Sicily, 9 m. S.E. of Nicosia. It is the ancient Agyrium and was till recently known as San Filippo d'Argiro. Contains a ruined Norman castle, and has sulphur mines and marble quarries. The bp. of Diodorus. Pop. 21,900.

Agis, the name of four Spartan kings, of whom the first is legendary, being supposed to have reigned in the eleventh century B.C. The historical A. I. (or II.), who reigned 427–399 B.C., was a distinguished general, and led the Spartan army at the battle of Mantinea. A. II. (or III.) (388–331 B.C.) was a ... league of ... Alexander ... Macedonia ... killed in ... III. (or I ... reigned 24 ... remedy th ... of the Spartans by a system of land redistribution, but his schemes were suspected of being dangerous to the welfare of the state, and he was put to death.

Agistment (law), an agreement entered into with an owner of land, whereby the latter, known for the purposes of such agreement as the agistor, allows cattle to pasture and lie on his land; also, the profit accruing to a landowner from such transaction. In this latter sense the word applied formerly more especially to pasturage in the royal forests.

Aglaophon the Elder (*fl.* fifth century B.C.), Gk. painter, lived at Thasis, and was the father and master of Polygnotus and Aristophon. His art is praised by Quintilian. A. the younger, said to have been the son of ... re, grandson ... ociated with ... and Pythias ... and 'Nemea with Alcibiades on her Knees.'

Agnadello, tn. of Cremona, Italy, 10 m. E. of Lodi. The site of two famous battles, on May 14, 1509, when the Fr., under Louis XII., defeated the Venetians; and on Aug. 16, 1705, when the Duke of Vendôme defeated Prince Eugene. Pop. 1500.

Agnano, Lake, situated in the crater of an extinct volcano near Naples, was drained in 1870 on account of its malarial properties. The waters are now used for remedial baths. On its shore is the famous Grotta del Cane.

Agnate (law). *Agnati* signified in Rom. law persons related through males only, *cognati* (cognates) being those in whose relationship one or other fe... distinctio... was foun... of *Patria potestas.*

Agnel, a gold coin struck in France by Louis IX., and so called because it bore on one face the Pascal lamb. It fell into disuse after the reign of Charles IX. The value was very variable.

Agnes, Saint, a beautiful Christian virgin in the reign of Diocletian, was, according to legend, in her thirteenth year publicly humiliated and executed in Rome for refusing the prætor's heathen son. Her festival is held on Jan. 21.

Agnesi, Maria Gaetana (1718–99), scientist and scholar, *b.* at Milan. In 17... er in the ... natural ... fer prin. ... treatise, ...

Agnew, David Hayes (1818–92), an American surgeon, *b.* in Penn.; *d.* at Philadelphia. Served as surgeon in the Civil War. Pub. *Principles and Practice of Surgery* (1883).

Agni, in the Hindu religion god of the fire of sun and lightning.

Agnolo, Baccio d' (1460–1543), *b.* at Florence, where he acquired considerable reputation as a wood-engraver. He went to Rome to study architecture, and afterwards settled

at Florence. His most important works are the villa Borghesini, near Florence, the campanile, or bell-tower, of the church of Santo Spirito (a production of Brunelleschi's) in Florence, the Bartolini and Orsini palaces, the choir stalls and organ-case of Santa-Maria-Novella. He was in charge of the works of the cathedral of Florence.

Agnone, a tn. of Campobasso, Italy, on W. slope of the Apennines, 22 m. N.W. Campobasso. Celebrated for copper mines, and sulphur and other mineral springs. Pop. 9166.

Agnosticism, the name invented by Professor Huxley in 1869 for the doctrine (in itself old) that man does not and cannot in the nature of things *know* anything about a spiritual existence either of God or man or of any after-death state. The term would appear to have been suggested to Huxley by the Greek words Αγνωστῳ Θεῷ (To an Unknown God), which we learn from Acts xvii. 23 was the inscription which St. Paul found upon an altar in Athens. Certain it is that the teaching of agnostics is fundamentally contrary to that of the gnostics (*q.v.*). The latter was an intensely mystical doctrine of the early Christian Church that claimed special revelation of the nature of the divine, while, on the other hand, the agnostic asserts that man's only cognition can be of the phenomenal world. This is not to say that there *may* not be a noumenal entity or soul behind the phenomenal —a First Cause—the 'thing in itself' of Kant—in fact, the agnostic would repudiate as dogmatic materialism or Atheism (*q.v.*) the denial of this possibility. His one answer to all such questions is that we do not know and there is so far no reasonable grounds for believing that we shall ever know. In other words, man, being finite, can never comprehend the Infinite. In this country A. had many able exponents in the seventies and eighties of last century, chief among them being Huxley, Professor Tyndall, and Herbert Spencer. The 'Belfast Lectures' of Tyndall and Spencer's *First Principles* did much to popularise A., but most of the conclusions of modern A. may be found in the works of Kant, the great German philosopher. Two books for and against the theory are *An Agnostic's Apology*, by Leslie Stephen, 1893, and Dr. James Ward's Gifford Lectures, 1899, entitled *Naturalism and Agnosticism*.

Agnostus, fossil crustacean of the Trilobite group, of simple anatomical structure, found in the Cambrian rocks.

Agnotherium (Gk. ἀγνώς, unknown, θηρίον animal), a fossil genus of mammalia resembling the dog.

Agnus Castus, name of a tree known in folklore as the Chaste Tree, from the idea of its virtue in preserving Chastity.

Agnus Dei (Lamb of God), a title of Jesus; generally used to denote the symbol of Christ, a lamb supporting a banner, and more particularly the waxen or dough tablets bearing such image, distributed by the pope at Easter, and worn as amulets. The prayer in the Mass beginning *Agnus Dei, qui tollis peccata mundi* (O Lamb of God, that takest away the sins of the world) is also known by this name.

Agonic Lines (Gk. ἀ, without, γωνία, angle), irregular imaginary lines on the earth's surface, passing through the magnetic poles on which the magnetic needle shows no deviation or declination, *i.e.* points true N. and S.

Agonus (Gk. ἀ, without, γωνία, angle), a genus of Acanthopterygious fish of the family Agonidæ, which inhabit cold seas. *A. Europœus* inhabits our own coast; *A. cataphractus* is the sea-poacher.

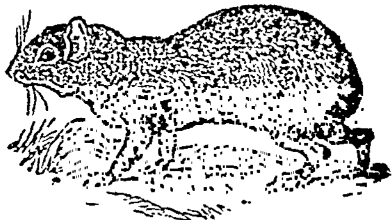
Agora, the public market and meeting-place of the anct. Gks., corresponding to the Roman forum. Amongst the better-known *agoræ* are those of Athens, Corinth, Messina, and Megalopolis. The name was also given to the people's assemblies of the Grecian states. *See* Gardner's *Ancient Athens* and the works of Pausanias.

Agoraphobia (Gk. ἀγορά, public place, φόβος, fear), a nervous disease, characterised by the sudden onset of symptoms of terror when the patient is in any busy open space, and by inability to cross it. The treatment is that for general neurasthenia.

Agosta, *see* AUGUSTA.

Agoué, seaport in Dahomey, Guinea Coast, between Great and Little Popo, near the border of Togoland. Pop. 5500.

Agoult, Marie Cathérine Sophie de Flavigny, Comtesse d' (1805–76), Fr. writer, *b.* at Frankfurt and educated



BLACK AGOUTI

in a Paris convent. She left her husband, Comte d'Agoult, to live with Franz Liszt, by whom she had three

children, of whom Cosima married, as her second husband, Richard Wagner. Under the pseudonym 'Daniel Stern' she pub. *Nélida, Lettres Républicaines, Histoire de la Révolution de 1848, Esquisses morales,* and *Mes Souvenirs.*

Agouti, a S. American rodent of the genus *Dasyprocta*, belonging to the same family as the guinea-pig. It does considerable damage amongst sugar plantations.

Agra, the headquarters of a dist. of 1856 sq. m., pop. 924,155, and of div. of 8545 sq. m., pop. 4,182,825, in the United Provinces, India. A. city, on the Jumna R., 840 m. N.W. of Calcutta, was for 150 years the cap. of the Mogul rulers, but was superseded in 1658 by Delhi as the seat of their gov. It was captured from the Mahrattas by Lord Lake in 1803, and was unsuccessfully besieged for some months during the Mutiny. Its most famous feature is the wonderful Taj Mahal, the marble tomb built for himself by Shah Jehan, who was also responsible for the other outstanding architectural features of the city, the Moti Masjid, or Pearl Mosque, and the Jama Masjid. At the suburb of Sikandra is the mausoleum of the city's founder, the emperor Akbar. The old city of A. covered 11 sq. m.; half of which is still inhabited; the fort has a circuit of over a mile, with walls 70 ft. high. The city is a busy railway and commercial centre, with cotton mills, flour mills, and carpet industry, the local manufactures are gold and silver embroidery, carving in soapstone, inlay work on white marble, carpets, and boots. Pop. of city 185,532.

Agram, a div. of Jugo-Slavia, and the chief tn. of the Croats, and the second largest of Jugo-Slavia, on the Save. It is called *Zagreb* in Croat. Much wheat and maize, tobacco and sugar-beet is grown, and the tn. has industries connected with the local agriculture and manufactures of leather, textiles, wood, and paper wares. During the Great War, A. was the scene of frequent riots and demonstrations in 1917, when subject nationalities of the Dual Monarchy were clamouring for autonomy. econd Pan-Slavic Congress held here arch 2, 1918. On Nov. 24, 1918, e Jugo-Slav Convention, held at A., rmally proclaimed the establishent of 'the Unitary K[illegible] rbs, Croats a[illegible] nfirming the [illegible] July 20, 19[illegible]. (See *also* under STRIA-HUNGARY.) Pop. of div. 21) 809,500, of tn. (1927) 150,000.

Agraphia, a nervous disease, show[ing] itself in an inability to set down thoughts in writing. The patient can only produce meaningless wor[ds] or letters.

Agrarian Laws, *see* LAND LAWS.

Agreement, *see* CONTRACT.

Agricola, Cnæus Julius (A.D. 37–93), Rom. soldier and statesman, was distinguished by ability and the integrity of his character. He was elected *consul* in A.D. 77, after a brilliant career in Britain and other outposts of the empire. From A.D. 78 to 87 he was governor of Britain, where he estab. the Rom. dominion considerably N. of the Forth, defeating the Caledonians under Galgacus in the battle of the Grampians. His fleet sailed round Britain and discovered it to be an island for the first time. His success aroused the jealousy of the emperor Domitian, who recalled him to Rome, where he spent the rest of his life in retirement. The story of his life by his son-in-law Tacitus (trans. Church and Brodribb, 1877) is one of the finest biographies in any language.

Agricola, Georgius (1494*–1555), Ger. metallurgist, his Ger. name being Georg Bauer, was *b.* March 24, 1494, at Glauchau, Saxony, and entered Leipzig University at the age of twenty. He became bachelor of arts in three and a half years; and in 1518 Vice-Principal of the Municipal School at Zwickau—in 1520, Principal. He published a Latin Grammar. He became a lecturer at Leipzig Univ. in 1522. From 1524 to 1526 he studied, in Italy, philosophy, medicine, and natural science. He became acquainted with Erasmus at Bâle. He returned to Zwickau in 1526 and in 1527 became town-physician at Joachimsthal in Bohemia, in the midst of a mining district. Here he busied himself in his off-hours studying the mines and reading metallurgical literature. In 1530 there was published, by Froben at Bâle, his dialogue *Bermannus*, a catechism of mining. In 1533—about which time he became city physician of Chemnitz—he issued *De Mensuris et Ponderibus*; and then he began writing *De Re Metallica.* He acquired a share in a mine at Albertham. He is believed to have been twice married. *De Ortu et Causis Subterrancorum*, in five books, was published 1546. Other scientific works followed; *De Re Metallica* did not appear till after his death. He was burgomaster of Chemnitz from 1546—with a break 1548–51—till about 1553. He remained a Catholic to the end,

* This figure (accepted by the Hoovers) is declared 'incontestable' by Dr. Reinhold Hoffmann (*Dr. Georg Agricola*, Gotha, 1905). Some biographies, e.g. *Ency. Brit.*, give the year '1490.'

though his patrons, the Electors of Saxony, were Lutheran. He was a member of the Diet of Freiburg, and was summoned to the Council at Dresden in 1546; he went afterwards on political missions to several foreign princes, and attended Diets at Leipzig, Torgau, and Dresden. He *d.* Nov. 21, 1555. An English translation of *De Re Metallica*, by Herbert Clark Hoover (now President of the United States) and Lou Henry Hoover, was published with the original illustrations, in a thick folio volume, in 1912.

Agricola, Johann (1492–1566), a pioneer of Protestantism, also known as Magister Islebius, from his bp. Eisleben, was educated at Wittenberg and Leipzig. After being sent by Luther to Frankfurt in 1525, to establish there the reformed religion, he preached for some time in Eisleben. In 1536 he was appointed to a chair at Wittenberg, but was compelled to resign in 1540 owing to his *Antinomian* controversy with Luther and Melancthon. He left for Berlin, where he was appointed court preacher to the Elector Jaochim II. of Brandenburg. He wrote many theological books, but his best known work is his famous collection of Ger. proverbs, 1528. *See* Kawerau, *Johann Agricola*, 1881, and Latendorf, *Agricolas Sprichwörter*, 1862.

Agricola, Rodolphus (1443–85), *b.* near Groningen, Friesland, and *d.* at Heidelberg. He was educated at Louvain, then went to Paris and Ferrara, where he attended the prelections of Theodore Gaza on the Gk. language, and also gave lectures on the language and literature of Rome. He visited Rome, returned to Holland, and then went to Heidelberg in 1482. He was a great scholar (his most important work being *De Inventione Dialectica*), a musician, and a painter.

Agricultural Co-operation. A.C. is one of the questions of the day, for upon its development seems to depend the revival of the industry. Societies for A.C. are either: (1) *produce societies* whose function is to market the produce of members. The produce marketed by societies in England and Wales includes hops and dairy produce, poultry, fruit, bacon, wool, fish, and livestock. After the Great War, a large central selling agency was formed to stabilise the prices of hops when Government control was withdrawn. Its membership was over 1300, and in 1927 it disposed of £2,000,000 worth of hops. A number of sheep stock club credit societies have been formed in Scotland, whose members are enabled to get advances from the State. (2) *Requirement societies,* whose object is to supply their members with seeds, implements, manure, etc. They are mainly farmers' societies, together with a number of associations of allotment holders. (3) *Service societies,* who supply some agricultural service, such as reaping or threshing, to their members. Many of this class of societies exist to provide their members with smallholdings or allotments, the total acreage under cultivation in Great Britain of members being about 25,000, with a membership of close on 100,000. In 1927 there were about 300 of the first-named societies, with a membership of 36,000; about 400 of the second group, with a membership of 90,000; and some 900 of the third group, with 165,000 members. The growth of the movement for A.C. was marked before the Great War and in the period immediately following, owing chiefly to uncertainty of prices after the period of inflation. In the last few years the rate of increase has shown a marked decline. Many of the larger associations of farmers and others concerned in the marketing of produce have been forced, by lack of working capital, to dissolve. Among these was the Agricultural Wholesale Society, which went into liquidation with a deficit of over £500,000. Again, a number of produce societies no longer carry on farming as an adjunct to their primary activities, which are mainly concerned with consumers' produce; and the reclamation of land for building purposes has had the effect of closing down many of the service societies. Statistics show sales by societies in Great Britain, including those of the produce of the consumers' societies, valued at £15,250,000, of which total nearly £9,000,000 represented requirements and £6,000,000 represented produce.

In the U.S.A., statistics published by the Bureau of Agricultural Economics show that in 1928 there were in that country nearly 11,000 agricultural co-operatives, with a total membership of nearly 3,000,000. The leading States in the movement are Minnesota, Kentucky, Iowa, Missouri. In Minnesota, the most highly developed in agricultural organisation, a high proportion of the farmers are associated for the buying and selling of their produce through co-operatives. Others are members of co-operative creameries, as in Canada, and yet others of live-stock shipping associations. A. C. seems destined to thrive in the U.S.A., the Government itself recognising in it a useful counter-activity to the universal problem, so acute in 1930, of over-

production. President Coolidge, in eulogising the movement in a speech in 1928, at Washington, said the National Government might well afford further assistance to it by setting up an Administrative Board with funds adequate to negotiating the experimental stage.

Agricultural Credit is defined as 'a means of facilitating the flow of capital into agriculture wherever it can profitably be used for these purposes.' It embodies the problem of finding 'an adequate agricultural substitute for the industrial joint-stock method of obtaining working as well as initial capital.' These two capital needs of agriculture are met by the short term, the intermediate and the long term credit.

Short-term credit is necessary to the farmer to finance marketing operations. Without this credit he may be forced to put his produce prematurely upon an unwilling market in order to meet his immediate liabilities. In the U.S.A. and Australia co-operative marketing associations receive the produce from the growers and make them an advance upon it. In Great Britain the best source of short-term credit is from the joint stock banks, and in 1923 (see *Report of the Committee on Agricultural Credit*) £46,500,000 was lent to agriculture by the five leading banks, and of the total £20,000,000 was for current trading. The security is that afforded by title-deeds, etc., or the loan may take the form of an overdraft. Agricultural wealth—stocks and crops—is not a recognised security with a bank, except by a Bill of Sale, and the publicity attaching to this form of advance prejudices it in the eyes of the farmer. In the U.S.A., however, the farmer's equipment, live-stock, and farm produce can be secured by a chattel mortgage, and on this security the American farmer is granted loans from the banks under the Federal Reserve system.

In Great Britain, if the farmer has no credit with the bank, or dislikes borrowing owing to his misunderstanding of the credit system, he can obtain credit from the tradespeople, auctioneers, dealers, seed-merchants, etc., by pledging his future produce. The drawback is that the farmer is thereby not allowed a free hand in the marketing of his produce. For the tenant farmer a third source of credit exists in the landlord, to whom rent may be paid some time after it is due.

Co-operative credit in Great Britain had some provision made for it under the Agricultural Credits Act, 1923. It was not successful, owing to the reluctance of the individual farm[er] to use the provisions, and the St[ate] has since withdrawn its financial su[p]port. On the continent the c[o-]operative system on the Raiffeis[en] model, originated in Germany, h[as] been a conspicuous success, depen[d]ing, as it does, on the deposits of [a] large number of peasant proprietor[s] rather than on the resources of th[e] State, as in Great Britain.

Long-term credit is not the busines[s] of the joint-stock bank. In Grea[t] Britain there had been no machinery enabling the farmer to obtain long-term or intermediate credit, necessary for farm purchase or permanent improvement. Provision has now been made under the Agricultural Credits Act, 1928, for long-term loans to be made to farmers by an agricultural mortgage loan company, assisted financially by the Treasury. Under this Act the farmer's short-term requirements are also met by the new arrangement of a floating charge on his stock and crops, similar to the American chattel mortgage.

In Germany the Landschaften or Mortgage Credit Banks were first started a century ago. Bonds are issued by the Landschaft on estates mortgaged in its favour. These bonds are realisable on the market, and are considered first-rate security. In the U.S.A. a similar principle obtains. Twelve Federal Land Banks and twelve Intermediate Land Banks were created in 1916 to meet the needs of the farmer for capital, raised on farm mortgages. The banks lend to co-operative associations for periods from six months to three years. The intermediate credit is necessary for production or marketing, or to hold over crops which can be warehoused and held for a possible rise in price. There is no reason why such a system of long-term credit should not obtain in Great Britain. A proposal to inaugurate a Central Land Bank was put forward in the *Report on Agricultural Credit* (Economic Series No. 8), published by the Ministry of Agriculture in 1926. Finally the Agricultural Mortgage Corporation was created—the first agricultural mortgage bank to be established in Great Britain. In April 1930 its first report was issued, showing a profit in working and its great use to the agricultural community. On March 31, 1929, the total of mortgage loans exceeded £4,000,000. The corporation is owned by banking and financial institutions and the dividend is limited to 5 per cent.

Agricultural Holdings. A Consolidating Act was passed in 1923 repealing and re-enacting, with changes, the Agricultural Holdings

Acts 1908 and 1913, and the Agricultural Act, 1920. Under this Act a tenant has a right to compensation for improvements whether the improvement was or was not one which he was required to make by the terms of his tenancy. A schedule to the Act enumerates the improvements to which the landlord's consent is required. They include the erection or alteration of buildings; laying down permanent pasture; planting osier beds; irrigation works; gardens; making roads or bridges, water-courses, ponds, wells, permanent fences; reclaiming waste land; planting of orchards or hops; sluices against floods; and, in the case of arable land, the removal of bracken, boulders, etc. The tenant also has a right to compensation for damage by game, where the right to kill and take the game belongs to some one else. Compensation for disturbance of his tenancy is payable for some other reason than failure to cultivate the holding properly or to pay the rent due, or bankruptcy, or breach of some term or condition of his tenancy.

Agricultural Machinery and Implements have undergone in the twentieth century a rapid development, chiefly in the direction of adapting mechanical power (steam, petrol, or electricity) to their use. For motive power three classes of engines are used: the portable, tractor, and stationary. The portable engine, mounted on road wheels, when not needed for threshing can be belted up to any of the machines used on a large estate for such operations as sheep-shearing, wood-sawing, etc. The tractor is used for ploughing and harrowing, and can haul mowers, binders, etc. Steam ploughing has been largely superseded by motor-tractor ploughing. For a type of tractor the high-speed engine on a light frame has certain advantages, but the heavy tractor, if the soil can carry it, saves expense in repairs. The stationary engine can be installed in the barn or shed to drive fodder and dairy machines. The usual type is a vertical engine with multitubular boiler. Electric motors are sometimes used.

The various agricultural implements may be classified under the following heads:—

Tillage implements.—Ploughing breaks up the soil into furrows, exposing it to the action of the atmosphere. Steam ploughing is not so successful as horse or tractor ploughing, but both plough and tractor must be adapted to the particular soil. Two distinct types of plough are the mouldboard plough and the disc plough, the former being more widely used. The function of grubbers, or cultivators, is to rend the soil with their curved teeth. The newest form of cultivator has a steel frame with sickle tines, able to penetrate the hardest ground. The spike-tooth or drag harrow is used to prepare the seed-bed after ploughing. The disc harrow is suitable for a stubble surface, and the spring-tooth harrow for hard or stony ground. Rollers are used to break up the clods and to smooth the surface after sowing. The most common type is the ring-roller. Various kinds of horse-hoes are used to stir the soil while the crops are still growing, at the same time destroying weeds.

Seeding machines.—Seed-sowing machines scatter the seed either broadcast or in furrows, according to the class of seed sown and the crop required. The seed drill deposits the seed in the soil at equal depths, and there is a device for covering the seed with fine soil after it has been deposited. The potato drill is a machine having cups on an endless chain, which lift the tubers from the hopper and plant them at regular intervals.

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Threshing machinery.—The thresher separates and cleans the grain, weighs it, and delivers it into sacks, at the same time delivering the cut straw tied into bundles. The whole process takes about 30 secs.

Manure distributors of various types admit of either broadcasting or drilling, and are able to deal with all kinds of fertilisers. The dung-spreader is simply attached to the end of a wagon, and distributes the manure fan-wise over a large stretch of ground.

Food-preparing machines save labour in preparing food for the various animals. Such are grist-mills, chaff-cutters, root-pulpers, machines for slicing and shredding roots, breaking oilcake, etc.

See also under DAIRYING and CHURNS. *See also* J. Wrightson and J. C. Newsham, *Agriculture*, A. A.

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Harvesting machinery.—The self-binder cuts the standing corn and passes the cut corn on to a sheafing deck, where it is bound and knotted and finally ejected on to the ground. For hay harvesting the reaper works in connection with the swath-turner and collector. There are also machines for loading, stacking, and pressing the hay. For potato-raising the machine is fitted with forks, which throw out the potatoes without bruising or scattering them. The sorter is a machine which grades 5 tons of potatoes per hour in three sizes.

Threshing machinery.—The thresher separates and cleans the grain, weighs it, and delivers it into sacks, at the same time delivering the cut straw tied into bundles. The whole process takes about 30 secs.

Manure distributors of various types admit of either broadcasting or drilling, and are able to deal with all kinds of fertilisers. The dung-spreader is simply attached to the end of a wagon, and distributes the manure fan-wise over a large stretch of ground.

Food-preparing machines save labour in preparing food for the various animals. Such are grist-mills, chaff-cutters, root-pulpers, machines for slicing and shredding roots, breaking oilcake, etc.

See also under DAIRYING and CHURNS. *See also* J. Wrightson and J. C. Newsham, *Agriculture*, A. A.

Stone, *Agricultural M*[illegible]*inery*, and H. [illegible] *inery*.

[illegible] establishes th[illegible] principles on which progress in agriculture must be based. It is allied with experimental work, which aims at directly improving farm methods. A. R. began with the experiments carried out in 1834 by Joseph Boussingault (*q.v.*) on his farm in Alsace. Since then, institutes for research in agriculture have sprung up all over the world, and it is now the recognised duty of a State to develop its agricultural [illegible] gards Great [illegible] fund was [illegible] capital of [illegible] grants have been made increasingly to all research stations. A.R. is organised throughout the British Empire, and in 1927 an Imperial Research Conf[illegible] called with [illegible] 'a stimulus [illegible] co-ordinatio[illegible] interest of Empire trade and production.' In England, Wales, and Scotland the research institutes are controlled by independent bodies, usually attached to universities, but dependent on the State for funds. In N. Ireland the work is entirely administered by the Ministry of Agriculture for N. Ireland.

The problem of agricultural science may be classified under the following heads:—

Soil.—The Rothamsted Experimental Station, founded by Sir T. B. Lawes (*q.v.*), is famous for its research into the chemistry of the soil.

Plant breeding.—The Cambridge Plant Breeding Inst. has produced two new forms of wheat—'Yeoman II,' superior for milling and baking, and 'Cambridge Browick,' a stiff-strawed wheat for intensive cultivation. Grassland farming is studied at the Welsh Station, Aberystwith, and the Scot[illegible] phi[illegible], Corstor-[illegible] of [illegible] principles [illegible] the John Innes Horticultural Inst., [illegible]stigated at Merton, Surrey.

Plant physiology, referring to the inner processes of growth, is studied at the Research Inst. in Plant Physiology, London. Field experiments, allied to this work, with hay, barley, and wheat, are conducted at Rothamsted, with oats at Lincluden, Dumfries, and with clover hay at Harper Adams College, Newport, Salop.

Fruit research is centred at Long Ashton, Somerset, at East Malling, Kent—famous for research in layered root stocks—and at Cambridge, in connection with the fruit-growing area there.

Plant diseases have been combated by practical research throughout the U.K. Pests which affect glasshouse crops are investigated at Cheshunt Research Station.

Stock-feeding is, in England, the concern of the Animal Nutrition Inst. at Cambridge University, and, in Scotland, of the Rowett Inst. at Aberdeen University. As part of a pig-research scheme, feeding trials are conducted at Harper Adams College.

Animal-breeding is the subject of extensive research at the Physiological Inst., Cambridge, while the work on sheep-breeding [illegible] the Research [illegible] s noteworthy. [illegible] milk is an out- [illegible] of the National Inst. for Research in Dairying, established at Reading in 1912. In 1920 a farm of 340 ac. and a dairy herd was acquired. The Dairy School at Kilmarnock exists primarily for education, but the use of bacterial cultures as a starter in cheese-making was first examined there.

Animal diseases.—The Inst. of Animal Pathology is at Cambridge, and the scope of research at the Royal Veterinary College, London, has been enlarged. The London School of Hygiene and Tropical Medicine, which studies animal and plant parasites, is equipped with field laboratories at St. Albans. In Scotland the Animal Diseases Research Assoc., transferred to Moredon, near Edinburgh, now works in conjunction with Edinburgh University. In N. Ireland provision for the study of animal diseases is made at the State laboratories at Stormont, Belfast. In March 1924 a committee of pathologists was appointed to investigate foot-and-mouth disease. Research was conducted at the Government laboratories, New Haw, Weybridge, and at the Foot-and-Mouth Disease Experimental Station at Pirbright. See V. E. Wilkins, *Research and the Land*; also *The Report of the Imperial Agricultural Research Conference*, 1927.

United States of America.—The fact that progress in industry depends on scientific research is well recognised in the U.S.A., and in no industry is research more active than in agriculture. $20,000,000 are expended annually on A. R., half of this sum being [illegible] of [illegible] nent the [illegible] r by als[illegible] Gov. pu[illegible] of A. R. of over $3,000,000 a year, and State Experiment Stations have been established, where research is carried on and the problems peculiar to the agricultural con-

ditions of any particular State are studied and reported on for the practical benefit of the farmers. Many of the Universities, *e.g.* Cornell, Wisconsin, Minnesota and California, have special faculties for A. R., and, in addition, agricultural education below the graduate standard of research is being rapidly developed. Schools have been set up, and travelling agents acting under an agricultural extension scheme do good work in bringing the results of laboratory research to the knowledge of the farmer. The American farmer is well educated, and this largely accounts for his efficiency. One important branch of A. R. is concerned with dairy produce. About $50,000 are spent each year by the Department of Agriculture on dairy research, and the result has been a prevention of loss through spoiled milk, and an increasing profit from the utilisation of dairy by-products. Agricultural waste of every kind is the subject of research, especially under the auspices of the Bureau of Chemistry and Soils. It is found to be possible to produce cellulose pulp from stalks and husks. The care of live-stock is the subject of research promoted by the Institute of American Meat Packers and the National Live Stock and Meat Board. A. R. is also directed to controlling plant diseases and insect pests of all kinds. The former is the work of the Bureau of Plant Industry, while active experiment is carried on to devise effective insecticides which will eradicate both plant pests and animal parasites. Great care is taken also in preventing the spread of insects or the introduction of a foreign insect into the country.

Agriculture (Lat. *ager*, field, *colere*, to cultivate) in the strict sense is the art concerned with tillage of the ground and the raising of crops, but is now generally understood to include every branch of farm practice, upon which all the natural sciences have more or less bearing, as epigrammatically summed up in the motto of the Royal Agricultural Society, 'Science with Practice.' He who would pursue A., or the allied industries of horticulture and forestry, with the maximum of success, should not only realise the possibilities presented by advances in science, and be conversant with every practical detail, but must also know how best to adapt his methods of procedure to local conditions.

History.—In W. Europe, as elsewhere, a great stride was made in civilisation when prehistoric man, during the polished stone or Neolithic age, ceased to be a mere wandering hunter and adopted a more settled life, resulting from his discovery of the possibilities of tillage of the ground and domestication of animals. The Neolithic farmer lived in village communities, his habitations being sometimes in the form of lake dwellings; his domesticated animals included the dog, horse, ox, sheep, goat, and pig; his crops included wheat, barley, and millet; and he practised the arts of spinning, weaving, and pottery-making. Such primitive prehistoric beginnings, improved by numerous successive stages, ultimately led to the evolution of the *village system* prevalent in England during Saxon times and for long afterwards. The houses of the villagers clustered together in the centre of an area partly consisting of pasture, but to a larger extent of arable land, divided into three fields, one under grain, a second under peas, beans, or grain, and the third *fallow*, *i.e.* without a crop, and in a state of preparation for receiving one in its turn. The introduction of potatoes, red clover, and turnips in the seventeenth century marked a considerable advance, and this century was epoch-making in several ways. During its first part the most important name is that of Jethro Tull, who demonstrated the advantage of *thorough cultivation of the soil*, and initiated the practice of *drilling* as against broadcasting seed, thus causing the crop-plants to grow in rows, the intervals between which can be stirred and cleaned by horse-hoeing. This led to the abolition—in most cases—of bare fallow, largely a device for thorough cleaning of land, and found a place for turnips and other *root-crops*. Hence the replacement of the 'three-field' system of the vil. community by the *Norfolk* or *four-course rotation*, initiated by Charles, second Viscount Townshend ('turnip Townshend'). The cultivation of turnips and other root-crops on a large scale rendered possible the winter feeding of cattle, and thus did away with the extensive use of salted meat during that season, a practice very detrimental to the health of the community. The same century witnessed great improvements in farm animals, due to the pioneer work of Robert Bakewell, who effected great advances in the quality of horned stock and sheep, largely by means of in-breeding. Among other [illegible]fits derived therefrom was gre[illegible] n in the age at which [illegible] l wethers were ready for [illegible]. In the later part of th[illegible] century we find *impro[illegible]* *draining land*, largely [illegible] ton and Smith. As[illegible] these advances cam[illegible]

provements in tillage *implements*, and much enclosure of land as a result of the 'new husbandry' rendered possible by Tull's *work*. During the nineteenth century many advances took place in continuation of those just mentioned, and sev. new lines of progress were initiated, but the years 1815–40 were marked by disastrous agricultural depression. The following dates are significant as marking the beginnings of various forms of *agricultural* activity which have had far-reaching results: Bath and West of England Agricultural Society, 1777; Highland and Agricultural Society of Scotland, 1784; Chair of Agriculture and Rural Economy in Edinburgh University, 1790; Board of Agriculture, 1793; Smithfield Club, 1798; Royal Agricultural Society of England, 1838; Rothamsted Experimental Station, 1843; Royal Agricultural College, Cirencester, 1845. The nineteenth century witnessed the improvement of crops by means of *artificial manures*, dung and various forms of rubbish being the only kinds of fertiliser previously employed. Bones came first, though Sir Humphry Davy (lecturing 1802–12) also mentions phosphate of lime, sulphate of potash, and salts of magnesia. Nitrate of soda and guano were first imported 1830; superphosphate resulted from the researches of Lawes and Liebig, and began to be used on a large scale in the early 'forties; potash manures, prepared from the Stassfurt deposits, came later, and were followed by the discovery of basic slag. The *improvement of wheat by crossing* was commenced by Knight towards the end of the eighteenth century, and taken up by Maund much later; while Shirreff began to improve cereals by *selection* in 1819, a variation of his method being subsequently practised by Hallett (1857). Practically all kinds of crop-plants were improved on similar lines. During the nineteenth century also the necessity of using *clean seed*—first realised in Denmark—was increasingly recognised, and thanks to the pioneer work of Messrs. Sutton (who have also played a prominent part in the production of new strains of cultivated plants), followed by many others, the average seed placed upon the market attained a high degree of purity and germinating power. The implements of tillage were still further improved, *reaping machines* and other contrivances for harvesting and after-treatment of crops were evolved in profusion, and different forms of *power* employed for working many of them. During the century great advances were also made in the knowledge and treatment of *plant diseases*, especially those due to the attacks of parasitic organisms. The rapid improvement in biological appliances (especially microscopes) and technique not only placed the study of *injurious fungi* on a scientific footing, but also enabled the science of *bacteriology* to be created, largely as a result of the pioneer work of Pasteur. Bacteria were found not only to be agents of infectious disease, but also to play an important part in the chemical changes which go on in the soil, in dairy processes, and so forth. Equally valuable progress was also made in respect of *live-stock*. Many breeds were improved or estab. on Bakewell's lines, and the formation of numerous breed-societies in the latter part of the century secured the maintenance of high standards. The biological advances above mentioned enabled great improvement in the treatment of *animal diseases*, while at the same time the importance of *farm hygiene* came to be realised. *Artificial foods*, of which linseed cake was the first (1795), gradually came to play an important part in winter feeding and the promotion of early maturity. Gilbert in England and von Wolff in Germany, with many others, placed the feeding of stock on a scientific foundation. The invention of the *cream separator* proved of great importance in the improvement of dairy work. A. has continued to make considerable advances during the present century on all the lines indicated. The application of *Mendelian principles* to the breeding of plants and animals, especially the former, is leading to considerable results, as in the production of *rust-resisting wheats* by Biffen, improved cereals, etc., at Svalöf, and so forth. Further progress in research, horse-breeding, and education are assured by the establishment of a *Development Fund*.

The soil.—Crops derive most of their food from the soil, in the form of a very dilute solution of mineral substances, though the air provides them with carbonic acid gas and they breathe in its oxygen, while the nitrogen of the atmosphere is fixed for their use by certain soil bacteria and—in the case of leguminous plants—by other forms of the kind living in swellings or nodules on the roots. As, too, animals depend directly or indirectly on plants as their source of food, it is obvious that a thorough knowledge of the soil is essential to the intelligent practice of A. Soils are formed by the disintegration or crumbling down of rocks as the results of the action

of various agencies, of which variations in temperature, rain, frost, and underground water are among the most important. A *sedentary soil* is formed *in situ*, and below it will be found a firmer *subsoil* passing down into the underlying rock. *Transported soils*, on the other hand, have been brought from a distance, alluvium by rivers, and glacial drift by ice-sheets and glaciers. But in either case a certain amount of organic substance, *humus*, due to the decay of organisms, must be present in addition to the mineral particles formed by disintegration in order to secure fertility. *Green manuring, i.e.* the ploughing-in of a rapidly growing green crop, is one way of supplying such material. The *physical properties of soils* largely determine the rate and amount of growth of crops, and therefore require notice. A particular soil consists of particles of varying size, with narrow interstices between them, collectively forming the *pore space*. Each particle is closely surrounded by a film of water, and it is these films which are utilised as *plant food*. The free water in the interstices is more or less removed by drainage, and if this goes on too slowly a free circulation of air must be promoted by artificial means, especially when a large proportion of clay is present. As the water in the soil is used up, fresh supplies rise from below by capillary action, which also replaces the loss by surface evaporation. While drainage gets rid of superfluous moisture, it is often necessary in a hot climate or season, more particularly in the case of sandy soils, to *conserve the moisture* present. This is effected by constant stirring of the surface, by hoeing and otherwise, evaporation being thus checked. In some cases *mulches* of decaying vegetation, or other substances more or less impervious to moisture, answer the same purpose. Such conservation is practised to a very large degree in 'dry' farming, a comparatively new practice in arid regions, such as parts of the U.S.A. The *temperature* of the soil, partly determined by colour and aspect, is also of importance, more especially because seeds requir[illegible] of heat in order to [illegible] whether a given crop is early or late very largely depends upon this factor. The *classification of soils* is based on their *chemical composition*, and depends upon the proportions they contain of sand (mainly silica), clay (impure silicate of alumina), carbonate of lime, and humus. *Sand* is warm, and easy to drain and till, but apt to become too dry, and but little retentive of plant-food. *Clay* is cold, retentive of moisture and plant food, hard to drain, and difficult to work. A proportion of *carbonate of lime* is important, becauses it furnishes one kind of plant-food, helps to break down organic matter, and improves the texture of clay. *Humus* supplies nitrogenous matter, and its presence is associated with important *bacteria*, some of which effect *nitrification* of organic substances—with production of *nitrates* valuable as plant-food—while others are *denitrifying agents* and lead to loss of nitrogen. Most soils are of *mixed* character, *loams* being primarily a mixture of sand and clay, while *marls* are made up of clay and calcareous matter. Medium loams, with a certain admixture of calcareous material and humus, are the best soils for general purposes.

Improvement of soils is effected in a great variety of ways, the aim being to impart such desirable physical and chemical characteristics as are naturally lacking or deficient. *Artificial drainage* of heavy soils, for example, removes superfluons water and promotes the circulation of air, and in such cases *winter ploughing* exposes the clods to t[illegible]ion of frost. Th[illegible] the other hand, [illegible], as by the treading of sheep folded upon them, while hoeing and similar acts of tillage help to conserve the moisture which drains away too readily. It may also be said in general that *tillage*, by means of ploughs, cultivators, harrows, and so forth, artificially imitates disintegration by natural agents, and produces a *seed-bed* of fine texture (tilth) made up of innumerable particles to which cling the films of moisture that serve as plant-food. The application of suitable *manures*, though in some cases of physical importance, is mainly directed to supplying forms of plant-food present in insufficient amount, such as—more particularly—lime, nitrogen, phosphorus, and potash. A distinction may here be drawn between natural and artificial manures. Among the former may be mentioned quicklime and ground limestone, of obvious importance in the case of soils deficient in calcareous matter, and also of great value in improving the texture of clays, and mellowing sour soils too rich in humus by disintegrating the organic matter and neutralising the acids. To the same category belongs *farmyard manure*, or *dung*, which not only improves the texture of soil, but is also a *complete fertiliser*, since it returns to the soil all the essential constituents of plant-food. The excreta of grazing stock have a similar chemical effect.

Artificial manures may contain one or more than one kind of plant-food. Among the latter sort may be particularly mentioned *Peruvian guano*, derived from the excrement of sea-birds, and containing compounds of nitrogen and phosphorus. The more highly nitrogenous deposits have now been worked out, but the birds are beginning to return to their old haunts, so that fresh accumulations are in progress. The droppings of poultry are of comparable character. Here, too, may be included *fish guano*, made up of all sorts of fish refuse. *Phosphatic manures* include various *bone* preparations, and *superphosphates* prepared by treatment with dilute sulphuric acid of finely ground bones or mineral phosphates. The most important deposits of the latter are in Florida and N. Africa. Accumulations of guano from which the nitrogen has been practically washed out ('crust' guanos) are also very valuable as a source of phosphorus. Those from Ocean and Christmas Is. take the leading place at present. *Basic slag*, or *Thomas phosphate*, produced as a by-product in iron-smelting, is another important phosphatic manure, giving particularly good results when reduced to a very fine state of division. The chief *nitrogenous manures* are *nitrate of soda*, of which large deposits exist in Peru and Chili, *sulphate of ammonia*, a waste product from gas-works, and various *refuse substances* such as soot, shoddy, dried blood, horns and hoofs, damaged feeding-cakes, and so forth. It has also been found possible, by electrical means, to cause the free nitrogen of the air to enter into combination, with production of *calcium nitrate* and *calcium cyanamide*. The leading *potash manures* are *chloride of potash*, *sulphate of potash*, and *kainit*, which consists of potassium sulphate and chloride together with compounds of sodium and magnesium. The *manurial treatment of crops* varies with their food requirements, which are by no means uniform in different plants; but in any case the aim is o add what is deficient in the soil as heaply as possible. The method nd time of application are naturally f importance. The *value of manures* best determined on the *unit system*, nd the *units* of nitrogen, phosphate lime, and potash are taken at 1 r cent. of a ton.

Crops in the widest sense are visible into what is broadly termed rass,' and plants which are grown on arable land. *Temporary grass-d* bears grass, with clover and ne other plants, and after a time econverted into arable. *Permanent ss-land* includes *pastures*, which are grazed but not mown, and *meadow* which are mown for hay either ever year or at less frequent interval The *botanical composition* varies wit the kind of grass-land, and it i obvious that the manurial treatmen must also vary, especially when it is remembered that grazing stock effect a certain amount of natural manuring; while meadows do not benefit in this way to the same extent, and the hay crop is a continuous drain upon the resources of the soil without any manurial return. The *seed mixtures* employed when land is laid down to grass are different according as temporary or permanent grass-land is the object in view, as also in relation to the kind of soil. In the case of *temporary grass*, rapid growth is of most importance, and perennial species need only be added should it be intended to maintain the area under grass for some years. A one-year lea may even consist of broad red clover only, a plant which botanically is not a grass at all. The seed-mixtures employed for the production of *permanent grass* chiefly consist of grasses and various leguminous plants, to which are sometimes added composites (yarrow), rosaceous species (burnet), and umbellifers (sheep's parsley). Land, before being laid down to grass, should be very thoroughly cleaned, autumn ploughing being followed in spring by harrowing and rolling, by which means a finely-divided seed-bed is obtained. It is a common practice to 'nurse' the young grass by sowing it with a corn crop, and sowing is followed by light harrowing and rolling. By mowing the first year, and giving either a complete dressing of dung or a suitable mixture of artificials, the incipient permanent grass will be given a fair start. In subsequent treatment chain-harrowing is of importance for pulling out moss and some injurious grasses, while the manuring varies according to the local characters of the soil. Grazed land, except perhaps for dairy purposes, gives the best result when horses, cattle, and sheep are maintained in suitable proportions, and turned out at suitable times. The processes involved in *haymaking* have as their object the conversion of grasses and associated plants into dry food. Although, unfortunately, largely dependent on weather conditions, there is here much room for judgment, and the time element has been under much better control since the introduction of various machines. Cutting should take place when the grasses are in flower, and before the formation of seeds has effected too great a drain on the nutrient sub-

stances contained in the stems and leaves. The subsequent operations have reference to the sufficient drying of the material, and the construction of stacks so that rain may drain away from and not accumulate in them. *Ensilage* is a method of converting herbage into succulent fodder, and as the necessity for drying is avoided, can go on independent of weather. The crop is collected and consolidated either in a simple heap or *silo stack*, or in a *silo*, which may be simply a hole in the ground, or a specially constructed receptacle. Fermentation takes place by bacterial action, and the resulting *silage* is sour (containing a large proportion of organic acids) when the temperature remains below 120° F., and sweet (with an aromatic odour) at higher temperatures.

It is generally recognised that the best results are obtained with crops on arable land when the same kind of plant is not grown continuously in any particular field, but a regular change or *rotation of crops* is practised. The advantages consist in the production of healthier plants, less liable to the attacks of pests, a saving in manure (since different crops vary in their requirements), provision for the needs of stock, and economy in labour. In this way, too, the plant-food contained at different depths in the soil is drawn upon, for the roots of some culture plants feed in the surface layers, while others penetrate more deeply. The introduction of a *leguminous crop* is attended with enrichment of the soil in nitrogen, for the bacteria living in nodules on their roots are able to cause the free nitrogen of the air present in the ground to enter into combination. The most typical arrangement is the *four-course* or *Norfolk rotation*—an autumn-sown cereal, roots, a spring-sown cereal, a leguminous crop. The autumn-sown cereal is commonly *wheat*, though *oats* may take its place, and its needs as regards nitrogen have been catered for by the preceding nitrogenous crop. The *straw* produced is valuable for fodder, litter, and thatching, and also provides work for the horses. The following *root-crop*, replacing the old bare fallow, may consist of turnips, swedes, mangels, carrots, or parsnips, where the nutritious part is really the root, and other plants which serve the same purpose, *e.g.* potatoes, of which the tubers are really thickened underground branches. The root-crop is important because it gives an opportunity of thoroughly cleaning the land, and provides a large amount of fodder for stock, the constituents of which, essential for plant-food, are largely returned in the form of dung. Apart from this, the root-crop is subjected to heavy manurial treatment, and the severe toll levied upon the soil by other stages in the rotation is compensated. The crop is also of great importance in helping to distribute the labour of men and horses throughout the year in reasonable proportion. The *spring-sown cereal crop* consists either of barley or oats, the one chosen depending upon local conditions. The fourth, or *leguminous crop*, is of a restorative nature, especially as regards nitrogen. It is commonly spoken of as 'seeds,' because it may consist of a mixture including grasses, and is sown at about the same time as the preceding crop, so that it may have a chance of establishing itself. Clovers are an important element, but may be replaced by peas or beans. Deviations from the four-course rotation are well known. They are arranged on the same principles, and may be regarded as adaptations to local conditions.

Cereals: Wheat is best suited to soils with a considerable proportion of clay, and does best in a warm dry climate. As in cereals generally, the production of *straw* as well as *grain* must be borne in mind when selecting a variety for any particular locality. The choice of a suitable kind of wheat (and the same thing is true for any other cultivated plant) may to some extent be guided by *variety tests*, where different sorts are grown side by side under similar conditions, as notably at the Woburn Experimental Farm. The experimental *plant-breeding*, to which allusion has already been made, is important in relation to the possibility of extending the wheat-growing area in this country with commercial success. The artificial manure giving best results for wheat (and other cereals) is nitrate of soda, to which basic slag or superphosphate may be added. Wheat should be harvested before it is quite ripe, and the average yield is about 30 bushels per ac., with 30–35 cwt. of straw. *Oats* may be grown on a great variety of soils, and do best in a cool damp climate. They must be harvested before coming ripe, as the mature grains easily fall out. The average yield is 40–60 bushels per ac., with 30 cwt. or more of straw. *Barley*, most important for malting, is most successfully cultivated in the lighter calcareous soils, and in areas where the climate is dry. Owing to the necessity for uniform quality in the grain, the cultural operations have to be unusually thorough and careful. Average yield, 22–40 bushels per ac., with about 20 cwt. of straw. *Rye* is very little grown as a grain crop in

Britain, but yields 24–32 bushels per ac., with 30–40 cwt. of straw. It is more often employed as a forage crop, which should be fed off early. It is hardier than the other cereals, and thrives in soils and under climatal conditions where these do badly. *Pulse crops: Beans* do best on heavy soils, especially when these are of calcareous nature. Potash and phosphoric manures are of most importance, for, like all leguminous plants, beans enrich the soil in nitrogen, as previously explained. The yield is 30–40 bushels, with 25–30 cwt. of haulm. *Peas* differ from beans in being better suited for the lighter soils. The average yield is about the same. *Root crops: Mangel* is adapted to stiff soils and a dry climate. Very thorough preparation of the soil and after-cultivation are necessary, and a heavy dressing of complete manure is necessary, whether by way of dung or a mixture of artificials. An application of common salt is very beneficial, which is intelligible when we remember that mangel is the improved descendant of a seashore plant (*Beta maritima*). The average yield is 15–25 tons per ac. *Sugar beet* is closely allied to mangel, and needs the same kind of treatment, but more labour is required, for the cultural operations have to be carried out with great attention to details. Attempts are being made to promote the growing of sugar beet on a large scale in Britain, and there appears to be no difficulty in raising the crop, while the percentage of sugar contained is satisfactory. Complete success, however, can only be attained if it should turn out to be possible to manufacture beet sugar in this country at a reasonable profit, for this means not only the provision of a steady market for the crop, but also the return of the refuse from the factory for feeding purposes. *Swedes* are a valuable variety of the turnip, and belong to a different natural order (Cruciferæ) from that (Chenopodiaceæ) including mangel, so that it is not surprising to find their requirements somewhat different. They thrive best in the lighter soils and in a cold climate, provided plenty of moisture is available. The crop is shallow-rooted and phosphatic manure is the one most necessary. Yield, 12–20 tons per ac. *Turnips* proper are comparable to swedes in most respects, but give on the average a larger yield, though not so valuable for feeding purposes. *Carrots*, a valuable crop for feeding horses and dairy stock, are only suited to light soils free from weeds, and require a fine seed-bed. The cost of production is considerable. Average yield, 10–20 tons per ac. *Parsnips* are a similar crop, but, being tolerant of frost, can be left in the ground until wanted. Average yield, 8–14 tons per ac. *Potatoes* are best suited to deep loose soils with a moderate amount of humus, but they can be successfully grown on almost any soil —except those of the heaviest kind— by adapting the treatment. They vary from early to late according to the time of maturity, and the production of the first kind is a very paying industry. The crop is usually propagated by 'sets,' which are either the entire tubers (thickened underground branches), or portions of the same including at least one 'eye' (bud). After a time a variety so cultivated begins to deteriorate, and fresh kinds are constantly being raised from seeds produced by crossing, though only a small proportion of these are of economic value. Manurial treatment may be by dung alone, by a complete mixture of artificials, or— and best—by a mixture of the two. Potash is particularly essential. Average yield 6–10 tons per ac., or less in the case of early potatoes. *Kohl rabi, thousand-headed kale,* and *cabbages* are cruciferous forms which, though they do not produce thickened underground parts, may broadly be classified with the root crops, and receive much the same treatment. They are very healthy, resist frost and drought, are extremely nutritious, and are improved by transplanting, thus increasing the time for cleaning the land. Average yield per ac.: kohl rabi, 20–25 tons; thousand-headed kale and cabbage, 30–40 tons. *Cruciferous forage crops:* Strictly speaking, a forage or fodder crop is one grown for the feeding value of its stems and leaves. The last three crops named are therefore sometimes included here. Grass grown for hay is placed in a distinct category, on account of the drying processes it has to undergo, but it (and other herbs) used for making silage are forage crops, as are cereals fed off before they produce grain. *Rape* is cultivated in much the same way as turnips, and *white mustard* is often grown as a summer *catch-crop, i.e.* a crop which is not part of a regular rotation, but grown in an interval. It is obvious that rapidly growing plants are best suited for this purpose The average yield per ac. of the two preceding crops is 10–15 tons. *Leguminous forage crops: Vetches* or *tares* are grown to provide spring or summer fodder, and are a common catch-crop. Potash manure is most essential, and some form of phosphate is usually added. When grown for seed the average yield is 25–30 bushels

per ac., with about 25 cwt. of haulm. *Lucerne* and *sainfoin* are perennial deep-rooted species suited to loams of calcareous nature. They may either be used for forage or converted into hay. *Scarlet* or *Italian clover*, commonly known as *trifolium*, is a catch-crop sown for the production of forage in the spring and early summer. *Clovers* and '*seeds*,' *i.e.* various clovers plus grasses, constitute an important course in rotation, sown with a cereal, or somewhat later, and coming into use a year afterwards. *Weeds* are plants belonging to various natural orders which are harmful in the main, using up nutrient matters to the detriment of crops, and helping fungoid and insect pests to tide over unfavourable seasons. It has been shown experimentally that they may reduce the yield by as much as one half. They are best kept down by using clean seed and keeping land in a high state of cultivation, to which a locally suitable rotation conduces in no small degree. The use of the hoe on arable land, constant cutting of thistles on grass-land, and spraying charlock with 4 per cent. solution of copper sulphate, may be mentioned as typical examples of remedial measures.

Farm Stock.—These chiefly consist of horses, cattle, sheep, goats, and swine. *Horses* are divided into *light breeds*, including thoroughbreds, hunters, hackneys, ponies, Clevelands, and coaching horses; and *heavy breeds*, to which belong shires, Clydesdales, and Suffolks. The heavy breeds are of agricultural value, because they do so much work on the land, and the question of farm profit or loss largely hinges upon the intelligent use of horse labour. Shires, Clydesdales, and Suffolks are capable of performing the work required of them, the last-named breed being the most local. They require regular feeding and a comparatively concentrated kind of food. Considering that they spend a large proportion of their time in the stables, these should be well ventilated, lighted and drained, in accordance with the principles of modern farm hygiene. *Cattle:* About seventeen breeds are officially recognised in Britain, some of which are valued as beef-producers, others for milk, and still others for both purposes. Among the first kind may be mentioned Aberdeen-Angus (black), Galloway (black), Hereford (red), Highland (black), N. Devon (red), and Sussex (red). *Dairy breeds* are Ayrshire (various), Jersey (fawn), Guernsey ([illegible]) [illegible] (various). [illegible] (black), [illegible], Shorthorn (and Lincoln Red) (various), S. Devon (yellowish), and Welsh (black). (The predominant colours are given in parentheses.) The *polled* or hornless breeds are Aberdeen-Angus, Galloway, and Red Poll. *Longhorns* are particularly interesting because they were greatly improved by the pioneer breeding work of Bakewell, but their horns were against them, and they were superseded by the Shorthorns. The latter, now more widely favoured than any other breed, first rose into prominence in the latter part of the eighteenth century, owing to the production of a famous Durham strain by the brothers Colling. Other notable strains were subsequently estab. in Yorkshire by Booth and Bates, and in Aberdeenshire by the brothers Cruickshank. At the present time much activity is displayed in the improvement of each and every breed of cattle, and the same is true for all classes of stock. Local conditions play an important part in determining the employment of breeds. Dual-purpose cattle are most useful for general purposes, but the great expansion of the dairy industry has led to very great improvement of the milking kinds, striking examples being afforded by Jerseys and milking Shorthorns, among others. In breeding for milk it appears that inheritance from the male parent is a factor of great importance, and the bulls employed should be *from a good milking strain*. Meat production is furthered not only by the improvement of the beef breeds, but also by judicious *cross-breeding*, *for in many* cases crosses are easily and quickly fattened, as also among sheep and pigs. The feeding and management of cattle are difficult arts, affording opportunity for the display of much skill and intelligence. The modern farmer is aware that the *requirements of farm hygiene cannot be* safely neglected, and the choice of artificial feeding-stuffs is now so large that the difficult *question of mixed rations* is receiving increasing attention. Subject to the *maintenance of* health, *the production* of beef and milk as cheaply and rapidly as possible is the *problem to be solved, and* manurial values necessarily enter into the necessary calculations. *Dairying* has reached a high pitch of perfection, *especially* in Denmark and other foreign countries, the branch least successful financially—in Britain—*being butter production*. Sev. Important *factors*, apart *from* the question of *co-operation*, have conduced to the *modern development* of the industry, and these include improvement of stock, rational *feeding* and management, and the keeping of

milk records, so that the worth of individual cows may be accurately known. The cream separator and other machines, and the introduction of power in large dairies, have reduced the labour bill and enabled some of the work to be effected in an improved manner. Even more important results have followed from the discovery that dairy processes are largely dependent upon the action of *bacteria*, some of which are beneficial and others harmful. Strict *cleanliness* in all stages is the best method of combating the latter. By the employment of *artificial cultures* of cream-ripening (lactic acid) bacteria it is possible to ensure butter of uniform quality, and this point has told strongly in favour of the Dan. and Ger. products, which have competed so successfully against us in our home markets. It is also recognised that bacteria have much to do with the flavours of different kinds of cheese, but this branch of the subject is still in its infancy.

Sheep are conveniently grouped into: 1. *Longwool breeds*—Cotswold, Devon Longwool, Kentish or Romney Marsh, Leicester and Border Leicester, Lincoln, Roscommon, S. Devon, and Wensleydale. 2. *Shortwool breeds*—Clun Forest, Dorset Horn, Hampshire Down, Oxford Down, Ryeland, Southdown, Shropshire, and Suffolk. 3. *Mountain breeds*—Black-face Mountain, Cheviot, Exmoor, Herdwick, Limestone, and Lonk. Among these the last group and the *Dorsets* are horned, and the remainder polled. The *Leicesters* are the oldest breed of pure kind, which was greatly improved by Bakewell, and has since been used very largely for enhancing the value of many other types. Border Leicesters are a branch of the same breed. *Lincolns* are pre-eminent for production of wool, *Suffolks* and *Southdowns* are notable for their mutton—though the flavour of that from mountain breeds is greatly esteemed—while *Leicesters*, *Shropshires*, and *Oxford Downs* are among the leading dual-purpose breeds. Sheep are not *only* of direct value ...
and wool, but ...
land. When f...
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effected, while they graze so closely that they can find abundant food on pastures which have already supported other classes of stock. The *mountain breeds* are of particular importance in utilising mountain tracts otherwise useless for agricultural purposes. The researches to be undertaken on the possibility of improving the herbage of upland pastures are not the least important enabled by the Development Fund. *Goats* are less used in this country than they might be, but attempts are being made to introduce them to smallholders as a cheap source of milk. They are even hardier than mountain sheep, and can be kept at a minimal cost. In this regard the *Norwegian peasant proprietor* sets us a good example.

Pigs are divided into Whites, Blacks, Berkshire (black with white points), Tamworth (golden-red), and Lincoln Curly-coated. As users of waste they play an important part in A., and are invaluable to the cottager and the smallholder. Owing to their comparatively small stomachs, they require concentrated food, given at frequent intervals. Some of the best results are obtained from cross-bred animals.

Poultry are an important adjunct to farm practice, but poultry-farming pure and simple is said only to pay when prize-winning stock is bred, or where pupils are taken at high premiums. As waste-utilisers they are invaluable, but the profits rapidly diminish when large amounts of barley-meal and grain have to be bought for their maintenance. Among the very numerous breeds of fowls *Wyandottes* excel in egg-laying and *Buff Orpingtons* for general purposes, while the best table birds are crosses with the *game breeds*. Among ducks, *Aylesburys* are the most esteemed, and yield a good profit when fattened early. *Geese*, on account of their grazing proclivities and hardy nature, are deserving of special commendation, but *turkeys* are delicate in constitution in the early stages, and can only be farmed to advantage by the specialist. The poultry industry has been greatly advanced by the invention of the incubator, the foster-mother, and other artificial appliances, and, thanks to Sir Horace Plunkett, the co-operative method (as in dairy produce) has effected the most extraordinary improvement in Ireland, so that the 'Irish egg' is no longer a mere symbol of political zeal.

Fungoid Pests and Bacteria.—The lower forms of plant life known as *fungi*, and the still simpler microscopic *bacteria*, are unable to subsist on the simple compounds sufficing for ordinary green plants, the living substance of which, aided by the characteristic green pigment *chlorophyll*, can utilise the energy of sunlight for building up complex substances from water, carbonic acid gas, and certain mineral matters. Fungi and bacteria, *in fact*, somewhat resemble animals in their way of feeding, and are either *saprophytes* (*e.g.* mushrooms), depending on dead organisms or the products of their decay, or else *para-*

sites, which prey upon living ones. Many of the latter attack cultivated plants and domesticated animals, and are therefore very detrimental to A. They propagate by means of dust-like *spores*, which are readily disseminated by the wind. *Black rust* (*Puccinia graminis*), which attacks various cereals and grasses, is visible in June and July as reddish streaks on the leaves and haulms, where innumerable *summer spores* (uredospores) are produced, capable of infecting fresh plants. Later in the summer the diseased patches turn black, owing to the production of *winter spores* (teleutospores) of corresponding colour. These are only capable of developing further on the leaves of the barberry, on the under side of which little orange spots (cluster cups) make their appearance. Here *æcidiospores* are formed, and these can infect cereals or grasses, starting the life-cycle anew. The name *Æcidium berberidis* is given to the barberry stage. *Yellow* or *spring rust* (*Puccinia glumarum*) is the form most prevalent in this country, and no æcidial stage is known. Rusts are able to inflict losses of the most serious kind upon A. (*e.g* about £20,000,000 in Prussia during 1891), and the establishment of resistant varieties appears to be the most promising method of combating them. *Smuts* are fungi which prevent the formation of grains, these being replaced by powdery black spores. *Oat smut* (*Ustilago avenæ*) may be checked by 'pickling' the seed corn in dilute solutions of copper sulphate or formalin, but this procedure appears to be useless in the case of the allied smuts of wheat and barley. *Bunt* (*Tilletia caries*) is nearly related to the preceding, but is distinguished by its greasy nature and unpleasant fishy smell. *Ergot* (*Claviceps purpurea*) attacks rye and meadow grasses, causing the grains to be replaced by hard spur-like bodies. These are particularly objectionable because they cause abortion in cows and ewes. *American gooseberry mildew* (*Sphærotheca mors-uvæ*) is a dangerous notifiable disease, best treated by destroying the infected plants. *Potato disease* (*Phytophthora infestans*) attacks all parts of the potato plant, and is a pest of the most serious kind. Spraying with Bordeaux mixture (dilute solution of copper sulphate and quicklime) is the best method of treatment, especially as a preventive measure, for it stimulates healthy and vigorous growth. *Black scab* or *wart disease* (*Chrysophlyctis endobiotica*) is due to a fungus of doubtful affinities, and is so serious as to be notifiable. Destruction of infected tubers and thorough disinfection of the soil are necessary, and the planting of a different crop for a time is highly advisable. *Club-root*, *finger-and-toe*, or *anbury*, causing abnormal swellings in the roots of turnips and other cruciferous crops, is due to the presence of a *slime-fungus* (*Plasmodiophora brassicæ*). The spores get into the soil, where they may be destroyed by application of lime, while diseased plants should be destroyed. *Bacteria* cause some diseases of plants, especially certain kinds of *rot in potatoes, turnips, and* cabbages, but it is in regard to livestock (and human beings) that they assume the most serious aspect, since they are responsible for the greater number of infectious or contagious diseases. *Inoculation is in some cases* a most valuable preventive measure, weakened cultures of the particular bacteria (*e.g.* of anthrax) being injected into the body, imparting to the tissues powers of resistance. So far the method is useless in dealing with tuberculosis, but the artificial culture known as *tuberculin* causes a definite rise of temperature in affected animals, and enables the disease to be detected even in its early stages. The matter is of especial importance in the dairy industry, for consumption in human beings, especially children, has often been traced to the use of milk from tuberculous cows.

Speaking generally, fungoid pests of plants are best combated by high farming and rational rotations, by which vigorous and healthy plants are produced, able to resist the attacks of parasitic fungi, especially in the critical early stages of growth. A knowledge of the life-histories of injurious forms often indicates the methods which can most advantageously be employed in dealing with them.

Animal Pests.—Among *mammals* the most pernicious forms are probably rats, mice, and voles, which all belong to the order Rodentia (gnawers). Rats and house mice are omnivorous, while field mice, harvest mice, and voles are vegetarian. All are exceedingly prolific, and when favoured by local circumstances, some of them—especially *field voles* (*Microtus agrestis*)—may make their appearance in vast numbers and become veritable plagues. *Rats* are objectionable in another way, for they help to disseminate the disease known as *trichinosis*, due to minute thread-worms, while some of the fleas which infest them are known to spread the germs causing *oriental plague*. In coping with injurious rodents their natural enemies—such as owls and weasels—should not be ruthlessly hunted down as 'vermin.' Ferrets, traps, poisons,

and forms of 'virus' (bacterial cultures) are all employed, with varying success. Only [illegible], supported by [illegible] to achieve anyth[illegible]. *Hares* and *rabbits*, which are also rodents, may do much damage to crops, and the ravages of the latter in Australia are matters of common knowledge. One large landowner in that continent expends £4000 per annum on rabbit-catching.

Wild birds have a varied relation to A. Some are wholly or mainly beneficial, others are undoubtedly harmful in the main, while still others are *sub judice*. Their feeding habits differ with locality and season, and only a greatly extended series of observations can give really *reliable information*. Nor must it be forgotten that species are liable to change their habits. *Starlings*, for example, at one time predominatingly beneficial, have begun to attack fruit in some districts. It may be remarked in passing that the interests of the farmer and fruit-grower are not identical in this direction, for birds which may be useful to the former are pests to the latter. Among birds entirely or mainly *beneficial* are game birds, birds of prey (except the sparrow-hawk), owls, swallows, martins, swifts, and cuckoos. Here, too, may be included many small perching forms which feed chiefly on insects and other little pests, *e.g.* jackdaw, tits, flycatchers, and wagtails. Decidedly *harmful* forms are the sparrow-hawk, pigeons and doves, hooded crow, bullfinch, greenfinch, hawfinch, house sparr[illegible] The [illegible] imp[illegible] and their numbers should be kept down, though measures of extermination often lead to the most unlikely and unpleasant results, for when once the balance of nature is seriously disturbed the consequences cannot be foretold. *Molluscs*, especially field slugs, are able to do considerable damage. Repeated applications of quicklime are here to be recommended. *Insects*, owing to their extraordinary variety, great powers of rapid propagation, and powers of flight, are among the most serious foes with which the farmer has to contend. Many of them have a complicated life-history, hatching out as a voracious *larva* (*e.g.* caterpillars of butterflies and moths), which passes into a *pupa* or resting sta[illegible] [illegible] giving rise in spring to the adult or *imago*. *Beetles* constitute an exceptionally large order, including many pests. The *cockchafer*, for example, lives below the surface as a larva (grub), feeding upon roots and underground stems. When adult it devours foliage. *Wireworms*, the subterranean larvæ of *click-beetles*, are especially [illegible] best dealt with [illegible]ation and the use [illegible] '*fly*' is in reali[illegible], and various long-snouted *weevils* attack the roots, flowers, or seeds of several crops. Some beetles, however, are useful, such as the little *ladybirds*, the larvæ of which devour large numbers of plant-lice (aphides). The order (Hymenoptera) including bees and wasps embraces the harmful *saw-flies*, which in the larval stage infest turnip[illegible] must [illegible] by *be*[illegible] while [illegible] wax. [illegible] much service by laying their eggs in the eggs or larvæ of many injurious forms, thus bringing about their destruction. *Butterflies* and *moths* (Lepidoptera) are almost always injurious, for their larvæ (caterpillars) are among the most serious enemies of crops. The extensive order of *bugs* (Hemiptera) [illegible] attack cabbages, turnips, beans, potatoes, hops, cereals, and other crops, and are probably the most prolific insects. The *two-winged flies* (Diptera) are in many cases injurious to both crops and stock. Of the former the *crane-flies* or *daddy-long-legs*, with their underground larvæ (leather-jackets), are most universally known, while the *Hessian fly*, *corn-midge*, and *frit-fly* attack cereals. Probably the most injurious member of the order infesting stock is the *ox-bot* or *warble-fly*, of which the larvæ live in the skin of cattle, damaging the hide, and reducing the value of the meat ('licked beef'). As a set-off against this, some of the flies are [illegible] r the larvæ of the [illegible] aphides, and thos[illegible] destroy caterpillars, while the adults of the former are effective agents for the crossing of many plants. [illegible] of insects [illegible] Britain. P[illegible] against insect pests, include the high [illegible] ations which [illegible] connection [illegible] The grease-[illegible] of fruit-trees are means of arresting the ascent of wingless female moths (*e.g.* winter moth) from the ground, where the pupæ are found, thus stopping in large measure the egg-laying that would otherwise take place on the

leaves and shoots. *Spraying* and *dusting* are important *remedial measures*, the poisons used varying in character as the pests possess biting (*e.g.* beetles) or sucking (*e.g.* plant-lice) mouth-parts. The aim in the former case is to poison the food, and in the latter to block up the breathing pores of the insect or otherwise destroy it by contact. *Spiders* and *mites* (Arachnida) differ from insects in various anatomical particulars, especially in the general presence of eight legs as against six, the nature of the mouth-parts, and either the fusion of the head with the succeeding region (thorax), as in spiders, or the union of head, thorax, and abdomen, as in mites. *Spiders*, destroying as they do many injurious insects, are decidedly beneficial, but *mites* attack cultivated plants and live-stock. Among the former are those familiarly known as *red 'spiders'* and *gall-mites*, which infest bush fruit. *Mange, scab*, and *itch* are examples of animal diseases due to the presence of these pests. Mites infesting plants are combated in much the same way as insects. The notifiable disease called *sheep scab* is caused by a parasitic mite (*Psoroptes communis*), and is dealt with by means of various dips. *Ticks* are large mites which suck the blood of domesticated animals, and are not only directly injurious in this way, but may also introduce the germs of diseases (Texas fever of horned stock, and probably louping-ill in sheep). In some parts of the world, *e.g.* E. Africa, they are exceedingly detrimental and often fatal to stock, but regular treatment with suitable dips seems likely to greatly further the interests of A. in such regions. The farmer has to contend with a host of parasitic worms, some of which are able to inflict serious losses. *Round worms* (Nemathelmia) are pale cylindrical forms, pointed at either end, and not divided into rings or segments, as are the beneficial earthworms belonging to an entirely different sub-kingdom (Annelida). The little *eelworms* (Anguillulidæ) are very injurious to several crops. The *stem eelworm* (*Tylenchus devastatrix*) causes stunting and malformation in oats ('tulip root'), rye, buckwheat, clover, and potatoes. *Beet eelworm* (*Heterodera Schachtii*) produces galls on the roots of sugar beet, and is the cause of 'beet sickness' of the soil. The *wheat eelworm* (*Tylenchus scandens*) attacks the young grain in wheat, causing them to be replaced by blackish *galls* (ear cockles, peppercorns, or purples). The *root-knot eelworm* (*Heterodera radicicola*) infests the roots of clover and lucerne. Sound farming and suitable rotations are here again the best measures to adopt, while seed wheat containing galls should be pickled in very dilute sulphuric acid. Various kinds of stock are also liable to be attacked by parasitic round worms, the smaller kinds being often called threadworms. The *palisade worms* or *strongyles* are particularly injurious to horses and sheep, while pigs are apt to be infested by *trichina*, vast numbers of which get into the flesh, and there pass into a quiescent or encysted condition. *Trichinosis* in human beings, an often fatal disease, results from eating infected pork which has not been properly cooked. Fowls are subject to the attacks of the *gapeworm* (*Syngamus trachealis*), which infest the breathing passages. *Flat worms* (Platyhelmia) include flukes and tapeworms. The notorious *liver fluke* (*Fasciola hepatica*) is sometimes found in large numbers in the liver and hepatic ducts of sheep-causing 'liver rot.' The parasite has a very complicated life-history, and part of its existence is spent in a small water snail (*Limnæa truncatula*) often found on damp low-lying land liable to be flooded The best precautionary measures consist in thorough drainage and proper control of the drinking water. *Tapeworms*, when adult, generally live within the small intestine of man or domesticated animals ('final hosts'), absorbing the digested food found therein. The body of such a creature consists of a minute head or *scolex*, clinging firmly to the lining of the intestine by suckers (and usually hooks), and producing a chain of reproductive *joints* or buds (proglottides), varying in number, shape, and size according to the species. The ripe joints, full of embryos, are voided to the exterior, and if swallowed by a suitable 'intermediate host,' can continue to develop, passing into a *bladderworm* or encysted stage, which can only become adult if swallowed by the final host. The *common tapeworm* (*Tænia solium*), for example, lives when adult in the human intestine, and as a bladderworm in the flesh of the pig. Infested or 'measly pork,' imperfectly cooked, is the means by which the parasite is transferred from pig to man. In another species (*T. mediocanellata*) the life-history is similar, but the bladderworm is to be found in the flesh of the ox. Two tapeworms highly injurious to stock live when adult in the intestine of the dog. The bladderworm stage of one (*T. cœnurus*) is found in the form of large cysts on the surface of the sheep's brain, and is responsible for the disease variously known as *staggers, gid*, or *sturdy*. The huge compound cysts of the other (*T. echinococcus*) are found

in the liver or other abdominal organs of man and various hoofed mammals. It is clear that an accurate knowledge of the life-histories of parasites such as those enumerated is *essential* for coping with them successfully. Some of the lowly microscopic creatures known as *Animalcules* (Protozoa) are the cause of *malarial diseases*, part of the life-history being passed within the bodies of *dapple-winged mosquitoes* (Anopheles), the bites of which cause infection of the blood of human beings. As the larvæ of mosquitoes live in stagnant water, it has been found possible, in some places, to get rid of malarial diseases by drainage, or by pouring petroleum into ponds infested by the larvæ. A thin layer is thus formed at the surface, with the result that the larvæ perish, being no longer able to obtain air. A number of particularly deadly blood diseases of human beings and stock are caused by Protozoa, which in a certain stage of their existence are known as *trypanosomes*. The chief agents of infection are flies and ticks. In tropical Africa the bites of certain *tsetse flies* (Glossina) lead to *nagana* or *fly disease* of horse and ox, and *sleeping sickness* of human beings. Most likely a *gadfly* introduces the germs of *surra* into Indian ruminants. *Texas fever* of cattle in N. America, and probably *louping-ill* of sheep in Britain, are communicated by ticks. Unknown at present are the infecting agents for *bile sickness* of cattle in the Transvaal, *mal de caderas* of the horse in S. America, and *dourine* of horse and dog in Algeria and the Punjab.

From what has been said regarding pests of all sorts it will be gathered that there is almost unlimited scope for scientific research, and upon this almost entirely depend the agricultural development of tropical regions now rendered unhealthy by malarial diseases, or uninhabitable by serious parasitic maladies such as sleeping sickness.

Agriculture during and since the Great War. During the Great War several temporary Acts were passed with a view to increasing the amount of home-grown corn in the country. These included the Small-Holdings Colonies Act (1916), which provided for the purchase of land by the State for experimental Small-Holding Colonies; the Corn Production Act (1917), which made provision for payments to growers of corn where the average prices of wheat or oats was less than the minimum, and for a minimum rate for agricultural wages, and gave power to the Board of A. to enforce proper cultivation; and the A. Land Sales (Restriction of Notices to Quit) Act 1919. The weakness of the U.K., however, in this its oldest industry was emphasised by the Great War. Notwithstanding that the command of the seas remained with the British Navy in so far as the unrestricted Ger. U-boat-warfare failed to account for more than a certain percentage of mercantile shipping, the shortage was much more acute than it would have been had A. been in a flourishing condition immediately before the War. In spite of various Acts, such as those designed to encourage town-dwellers to go back to the land, the state of A. in the U.K. has grown steadily worse. A period of depression began in 1922. Corn markets were adverse, with the result that the acreage of ploughland gradually diminished. In a measure the resistance of the Norfolk farmers in 1923 to the wage demands of the workers was a contributory cause of this diminution; but this resistance, in view of the poor prices of corn, was justified and unavoidable. By 1927 the area of ploughland in England and Wales had declined by about 700,000 ac. since the opening year of the Great War, and in Scotland by some 20,000 ac. The state of A. in Great Britain, in face of adverse economic forces, became critical in 1927 and chief hope seemed to lie in agricultural credits. By the Agricultural Credits Act, 1923, the Ministry of A. is empowered to organise agricultural credit societies or, in other words, approved societies registered under the Industrial and Provident Societies Act 1893, having for their object the making of advances to members for approved agricultural purposes.

In 1928–29 A. in the British Isles was still passing through the period of depression which began in 1922, and at present (1930) there appears to be small hope of definite improvement. High costs and low prices in 1928 spelt losses and a generally uncertain outlook which, continuing to the winter and spring of 1930, led to persistent agitation for Government intervention. The large stocks of grain produced in Canada, the United States, and Argentina have had an increasingly detrimental effect on the prospects of A. in Great Britain, and in some quarters a tentative suggestion has been made for reciprocal arrangements with the Dominions, whereby foreign wheat should be subject to a tariff for the benefit of both Dominion and home-grown grain. Other critics have as emphatically advanced the theory that better marketing arrangements are the real panacea, and in any event a far more scientific remedy

than the much-boomed policy of 'free trade within the Empire.' Similarly, in the U.S.A. A. has become an urgent national economic problem requiring solution, according to different schools of thought, by such measures as the tariff, improved transportation, and the formation of a Federal Farm Committee to devise remedies in the way of co-operative marketing and clearing-houses for agricultural products. As in England, there is a growing realisation of the ramifications of A. and an appreciation of the fact that it is by no means a single industry, capable of regeneration by a simple panacea, but rather a congeries of specialised and mutually exclusive industries, depression in any one of which must have its repercussion on the rest. Thus remedies by a single legislative measure have not been widely advocated, while attention has become more closely centred in scientific research and in investigation of the causes of depression. Consistently with this realisation, the U.S. Chambers of Commerce recommended a rigid co-ordination of the waste-land reclamation and afforestation policies of the Federal Government, restriction of additional production at public expense to economic requirements, protection for such branches of A. as were seriously hit by foreign competition, development of agricultural credit facilities, co-operative marketing, and scientific research. Each and all of these recommendations have been mooted by experts in Britain and some of them put into execution, with perhaps a bias in favour of credit facilities, marketing, and research. One other remedy supported in some political circles with no little plausibility is, or was, the development of co-operative farming or farming on an extended industrial scale, on the plea that such methods reduced the cost of production. This may be said to be an attempt to apply the principles of rationalisation, but so far the advocates of independent or individual ownership have prevailed.

In Europe generally depression also followed in the wake of the Great War, and though by 1928 the grain crop in Russia attained pre-war figures, the output available for export was far below those figures, the explanation being the cutting up of the large estates into small individual farms, with a consequently reduced and impoverished yield. A large measure of international control and a higher degree of centralised administration were advocated at the General Assembly of the International Institute of A. held in 1928 in Rome. Most of the nations with considerable agricultural interests appear to have agreed to participate in the preparation of a world census of A. to be taken in 1930, the collection and transmission by cable of statistics on crops and live-stock being regarded as an important part of the administrative side of the activities of the Institute.

Organisation of Agricultural Education in Britain.—Although in many ways Great Britain is still behind such countries as the U.S.A., Germany, Denmark, and Sweden, considerable progress was made before the Great War in agricultural education, upon which the future of A. so largely depends. The twofold system of universities and colleges for higher education and the county council courses for young persons, which now prevail, were merely the putting into execution of plans which were far advanced before the War, but stopped by that period of disturbance. These plans envisaged the replacement of the pre-existing and chaotic work of a large number of authorities of various kinds by an imitation of the Scottish system of agricultural provinces, with departments of the universities at the head of each. Scotland has three such provinces, under the universities of Aberdeen, Glasgow, and Edinburgh. It was proposed to divide England into twelve provinces, with a central institution at the head of each, the institutions being Aberystwith Univ. Coll., Bangor Univ. Coll., Bristol Univ. (with the associated Royal Agric. Coll.), Camb. Univ., Harper Adams Coll., Leeds Univ., Midland Agric. Coll., Armstrong Coll., Newcastle-on-Tyne, Reading Univ. Coll. (now Univ.), Seale-Hayne Coll., Newton Abbot, Manchester Univ. (with the associated college at Holmes Chapel), and Wye Coll. (part of London Univ.). This organisation has now been adopted, and two other institutions have been added, namely Oxford Univ. and Nottingham Univ. Coll., making fourteen institutions in all where the higher teaching and research are to be given, aided by experimental stations at Rothamsted, Woburn, and elsewhere. Closely correlated with, and looking for advice to the central institution in each 'province' are the 'farm institutes' (as was proposed before the world war), broadly similar to those which have for some time been established at Basing, Ridgment, and Newton Rigg, and well known in other countries. The position of these institutes has been fixed in accordance with the nature of local farming, and with due regard to convenience of access. The universities

and colleges provide courses of two to three years in duration, with diplomas or degrees. As advisory centres they employ specialists in ... and the like, ... to the general ... technical instructors under the county councils. These latter bodies provide short courses for boys and girls already on the land or intending to return to it. The farm institutes usually give a six-months' winter course in practical A. to young persons of sixteen years of age and upwards, and in summer courses in dairying and poultry-farming. Some county councils, however, have organised only a more economical and less efficient system of evening lectures and day classes, without the obvious advantage of facilities for actual practical training on neighbouring farms, where various '*demonstrations*' and '*experiments*' of agricultural importance are conducted. All this work is under the control of the Board of A., but the system is made complete by linking up certain activities of the Board of Education, especially the imparting of a 'rural bias' to rural elementary and secondary schools. This is particularly important, since the children of tenant farmers mostly receive their education at the former, and the children of agricultural labourers at the latter. This concentration on a 'rural bias' takes the form of giving lessons in geography with special reference to the physical characteristics of the district, effect of climate, and the like, but compulsory further education would greatly promote the ends in view.

(*See also* AGRICULTURAL CO-OPERATION; AGRICULTURAL CREDITS; AGRICULTURAL HOLDINGS; AGRICULTURAL RESEARCH.)

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Agriculture in U.S.A.—Practically every known kind of field crop is cultivated in the U.S.A., but the cereals (Indian corn, hay, cotton, wheat and oats in the order of their importance) represent three-fourths of the total value of all American crops. The extent of arable land under cultivation is nearly 400 million ac., and pasture land 783 million ac. The total acreage of the farms by the 1925 census is 924,319,352 ac. and the number of farms is 6,371,640. The value of farm property approaches sixty billion dollars. The farm population, however, has decreased, figures for 1929 being 27,511,000, the lowest for twenty years. This is partly due to the agricultural depression of 1921–24, from which A. is only just recovering. During this time most of the farmers' war-time prosperity was devoted to meeting post-war conditions—a larger market, lower prices and less labour. A. in America has developed rapidly along the lines of mechanisation, and thus a greater production has been obtained on a smaller crop acreage and with fewer workers. The future tendency of A. is towards larger farms and greater technical improvements both in farm-machinery and in the scientific care of crops and live-stock. The most stable and important of American crops is Indian corn, the average annual yield being nearly three billion bushels, ... quarters of the ... its value is ove ... The six most productive States of the 'corn-belt' are Iowa, Illinois, Nebraska, Missouri, Indiana and Ohio, but Indian corn is widespread over the whole of the U.S.A. The flourishing stock-breeding industry depends largely on the corn crop, of which about 85 per cent. is fed to live-stock, chiefly hogs. The forage crops, which are second in importance, include pasture, hay, clover, alfalfa, etc. The third most important crop, cotton, is dealt with under that head. The wheat crop, fourth in importance, covers about 60 million ac., principally in the States of Kansas, N. Dakota, Minnesota, Nebraska, S. Dakota, Washington, Illinois, Oklahoma, Indiana, Ohio, and Missouri. American and Canadian wheat is

called winter wheat or spring wheat, according to the season of sowing. Winter wheat represents nearly three-quarters of the American produce, and the annual average yield of both kinds is 810 million bushels. The U.S.A. is the largest wheat-growing country in the world, and in addition, produces a quarter of the world's supply of oats, thereby equalling Russia. The average annual oats crop is 1300 million bushels, half of which is produced in Illinois, Iowa, Wisconsin, Minnesota, Nebraska and Indiana. Other important American crops with their average yield in millions of bushels are: barley (209), grain sorghums (123), rye (55), rice (37), flaxseed (23), and buckwheat (14). In addition, there are the legume crops, field beans, soy beans and peas, while the white potato crop is 460 million bushels and the sweet potato crop 80 million bushels. Of the fruit production, apples and peaches form the largest share, being 185 million bushels and 70 million bushels, respectively. In addition to field-crops, the U.S.A. is the largest stock-breeding country in the world, the average figures for one year being 56 million cattle, 55 million swine, and 47 million sheep.

Agricultural Education in the U.S.A.—Agricultural education in the U.S.A. has a long history, and, like many sound movements, had its beginnings in the efforts of private individuals interested in the productivity of the land. Comparatively early in the last century vocational training in A., as indeed in other industries, was a feature of the manual labour schools in New York State. By the latter part of the nineteenth century county agricultural schools had become well established and in the first decade of the present century over fifty agricultural high schools were in existence, while agricultural courses were given in hundreds of ordinary high schools. The system now comprises agricultural schools, district agricultural schools, agricultural departments of high schools, and ordinary schools giving instruction in elementary agriculture. At the apex of the system of agricultural education in the U.S.A. are the Agricultural Colleges or State Colleges and Universities in direct association with the United States Department of Agriculture. These institutions are mainly concerned with research and experiment, this latter function being carried out at stations organised by the Department under the Hatch Act of 1887.

Agriculture, International Institute of. This body which has been in existence since 1905, now receives contributions from over fifty countries for the continuance of its activities in collecting and publishing all kinds of information on farming, live-stock, trade in agricultural products, wages, new diseases of crops, and agricultural co-operative insurance and credit. In the World Economic Conference, held at Geneva in 1927, under the ægis of the League of Nations, the essential interdependence of A., industry, and commerce was generally conceded, it being recognised that no more than a temporary prosperity can be enjoyed by any one of the three independently of the other two. The relations of the Institute with non-official agricultural societies or bodies, expert or professional, have recently been strengthened, so that on its technical and scientific side the Institute is being increasingly recognised as a most valuable consultative body. A World Agricultural Census is being prepared for 1930–31. (*See also* under AGRICULTURE.)

Agrigentum (Gk. Ἀκράγας), now Girgenti, a tn. on the S. coast of Sicily. It was founded by a Doric colony from Gela about 579 B.C., was at first free, but came under the gov. of the tyrant Phalaris about 560, and then under that of Theron, 488–472. It flourished in wealth and luxury, and was one of the most splendid cities of the ancient world. It was however, destroyed by the Carthaginians, 405, and though rebuilt by Timoleon, it never regained its former greatness. In 210 it was in the power of the Romans, and was the bp. of the philosopher Empedocles. There are remains of the temples of Jupiter, Hercules, Æsculapius, and Concord. The modern Girgenti is irregularly built, is a bishop's see, and does a small trade in corn, fruit, and sulphur.

Agrimonia, a genus of the Rosaceæ, commonly known as *agrimony*. It has medicinal properties, and is used in herb teas. *A. odorata* and *A. eupatoria* are found in fields and under hedges.

Agrinion, a tn. of Acarnania and Ætolia, Greece, 18 m. N. of Missolonghi. It has a considerable trade in tobacco. Pop. 11,890.

Agriope (Gk. ἀγριωπός, fierce-looking), a genus of acanthopterygious fishes, belonging to the family Scorpænidæ of the order Amioidei. They are distinguished from allied genera by their suborbital plates, which extend backwards over the cheeks and thus protect them. The *A. torvus*, found near the Cape of Good Hope, exceeds 2 ft. in length, and is called a *zee-paard*, or sea-horse, by the Dutch colonists; the *A. verrucosus*,

or warty agriope, also found at the Cape, has the skin of the head and body entirely covered with prominent conical protuberances; the *A. Peruvianus*, found near the S. American coast, is 8 or 9 in. long.

Agrippa, Heinrich Cornelius (1486–1535), Ger. philosopher and occultist, had a stressful and troublous career as writer, soldier, physician, and lecturer. His chief works are the *De Incertitudine et Vanitate Scientiarum* and *De Occulta Philosophia*, 1531–33. See *Life* by Henry Morley.

Agrippa, Herod, *see* HEROD.

Agrippa, Marcus Vipsanius (63–12 B.C.), Rom. general and naval commander, came of a humble family, but by means of his own ability and the influence of his friend Octavius, afterwards the Emperor Augustus, attained to high position. After the murder of Cæsar he accompanied Octavius to Italy, where he distinguished himself in the first war against Antony. Later, as consul, he held the command in Gaul, defeating the Aquitani and inflicting severe punishment on the Ger. tribes beyond the Rhine. As commander of the fleet he was largely responsible for the defeat of Pompey, gaining signal victories at Mylæ and Naulochos. At the famous battle of Actium he defeated the combined fleets of Antony and Cleopatra. By his third wife, the daughter of Octavius, he had Agrippina, afterwards wife of Germanicus. *See* Merivale's *Romans under the Empire*.

Agrippa, Menenius, Rom. consul in late sixth century B.C. Famous for his conquest of the Sabines and Samnites, and as the supposed originator of the fable of the 'Belly and the Members,' used as an allegory to calm the rebellious plebs. *See* Livy, bk. ii., and Shakespeare's *Coriolanus*.

Agrippina the Elder (*d.* A.D. 33), [illegible] rippa and [illegible] endeared [illegible] ulace by [illegible] displayed in the Ger. campaigns of her husband Germanicus. On the mysterious death of the latter, probably engineered by the jealous Tiberius, her popularity aroused the emperor's hatred, and she was banished to the isle of Pandatoria, where she is supposed to have starved herself to death. She was the mother of the notorious Agrippina the Younger and Caligula. *See* Tacitus' *Annals*; J. B. Bury's *Roman Empire*, 1893; and Baring-Gould's *Tragedy of the Cæsars*.

Agrippina the Younger (A.D. *c.* 15–59), daughter of Germanicus and Agrippina, was mother of Nero by her first husband, Cn. Dom. Ahenobarbus (*d.* A.D. 40). Her second husband, Crispus Passienus, she was accused of poisoning. She married thirdly her uncle, the Emperor Claudius, and induced him to set aside his own son, Britannicus, in favour of Nero. She then had him poisoned, and Nero became emperor under her regency. Tiring of her ascendancy, Nero had her slain. *See* J. B. Bury's *Roman Empire*, 1893, and Baring-Gould's *Tragedy of the Cæsars*.

Agropyron (from Gk. ἀγρός, field, πυρός, wild wheat), a genus of plants, belonging to the Gramineæ. *A. repens*, the couch-grass, roots at the nodes of its long rhizome, and is very troublesome to destroy in cultivated soil, rooting as it does wherever it is cut.

Agrostis, a genus of creeping grasses (order Gramineæ), of which two species, *A. alba* and *A. vulgaris*, are found in Britain, and are called *quitch* or *quicks*. *A. alba*, the Irish florin grass, grows in marshy land and forms a valuable pasture.

Agtelek or **Aggtelek**, a vil. of Gömör, Hungary, which is famous for its large stalactite cavern. It is second in size to the largest of the world, and is called Baradla (steaming-place).

Aguadilla, seaport in Porto Rico, standing on a beautiful bay of the same name, 65 m. W. of San Juan. It has a large trade in coffee, sugar, and tobacco. Pop. 8,035.

Aguado, Alexandre Marie (1784–1842), famous Fr. financier, *b.* at Seville; was aide-de-camp to Marshal Soult in the Spanish War of Independence; left army in 1815 and entered the banking world. In 1823 he became the financial agent of Spain in Paris, and negotiated sev. important Sp. loans and the Gk. loan of 1834. In 1828 he was naturalised as a Fr. subject. He received from Ferdinand VII. the title of Marques de la Marismas del Guadalquivir. Died at Gijon, Spain, leaving an immense fortune.

Aguardiente (burning water), a coarse kind of Sp. brandy, made from grain or potatoes, and flavoured with aniseed.

Aguas Calientes, tn. and state, Mexico, so called from hot springs in the vicinity. The tn. 270 m. N.W. of Mexico city, has a considerable trade, and is noted for its beautiful fruit gardens and fine climate. Pop. 35,000.

Ague (Fr. *aigu*, sharp), a term applied to malarial fever, particularly to the variety in which a paroxysm of intense chill, causing shivering and chattering of the teeth, alternates with a hot stage, when the face is flushed and the skin hot to the touch. The cause is infection by a parasite associated with the mosquito, and the treatment consists of the use of quinine. *See* MALARIA.

Aguesseau, Henri François d' (1668–

1751), native of Limoges, was in succession advocate-general (1690), procurator-general (1700), and chancellor of France. He lost the chancellorship in 1718, through his opposition to Law's system of finance, recovered it in 1720, lost it again in 1722, and assumed the office for the last time in 1737. According to Voltaire, he was the most learned magistrate France ever had. His works were pub. in 13 vols. *See* biographies by Boullée, 1849, and Monier, 1864.

Aguilar, Grace (1816–47), novelist and Jewish historian, *b.* at Hackney of Jewish parents. Her chief works are: *The Spirit of Judaism*, 1842; *The Jewish Faith*, 1845; *The Women of Israel*, 1845; and the famous novel *Home Influence*, 1847.

Aguilar de la Frontera, tn., Sp. prov. of Andalusia, 22 m. S.S.E. of Cordova. Has the ruins of a magnificent Moorish castle. The chief trade is in wine, corn, and oil. Pop. 13,000.

Aguilas, seaport of Murcia, Spain, on Mediterranean, 38 m. S.W. of Cartagena. It exports lead, esparto grass, soda, grain, and iron ore, and has large smelting works. Pop. 17,078.

Aguilera, Ventura Ruiz (1820–81), Sp. lyric poet, *b.* at Salamanca; went to Madrid in 1843, and there occupied many official and journalistic positions under the liberal gov. Among his works are: *Satyras*; *Ecos Nacionales*; *Elegias*, 1862; *Armonias y cantares*, 1865; *La Arcadia Moderna* and *Legenda de Noche-Buena* (1872). Selections from his poems, entitled *Inspiraciones* and *Poesias*, were pub. in 1865 and 1880 respectively, and his complete works at Madrid in 1873.

Aguinaldo, Emilio (*b. c.* 1870), Filipino revolutionary leader. At the outbreak of the 1896 rising he was Mayor of Cavité Viejo, but in consequence of the part he took in the rebellion, consented to go into exile at Hong Kong. He returned in 1898 to aid the U.S.A. against Spain, but turned against them on their purchase and annexation of the is., and attacked Manila in Feb. 1899. Fighting continued with varying success till March (1901), when A. was captured by General Funston at Palawan. He swore allegiance to the U.S.A. the next month, and retired into private life.

Agulhas, Cape (The Needles), the most southerly point of Africa, so called by the Portuguese from its sharp-pointed rocks. It is dangerous to shipping, on account of fogs, rocks, and uncertain currents. The Agulhas Bank, with an average breadth of 40 m., stretches for 150 m. from the Cape to the Great Fish R.

Agustina (*d.* 1857), the 'Maid of Saragossa.' A vivandière of the Sp. army, who attained fame by her gallant behaviour during the siege of Saragossa by the Fr. 1808–9. *See* Byron's *Childe Harold* and Southey's *History of the Peninsular War*.

Ahab, son of Omri and King of Israel (918–896 B.C.), married Jezebel, the daughter of Ethbaal, King of the Sidonians, and through her influence introduced the worship of Baal. This and the subsequent persecution of the priests and prophets of Jehovah brought him into conflict with Elijah, who managed to hold his ground. Though lacking in moral courage, Ahab united considerable personal courage with a public spirit that evinced itself in a fondness for the construction of fine buildings. He twice defeated the Syrians, but was finally killed in battle with them at Ramoth-Gilead. *See* 1 Kings xvi. and xxii., and Kittel's *History of the Hebrews*.

Ahanta, a small dist. in the Gold Coast, Africa, noted for its gold. It is a British possession.

Ahasuerus: 1. The traditional name of the Wandering Jew. 2. The name of several Persian kings mentioned in the Bible, of whom the best known, the husband of Esther, has been identified with Xerxes. The name is probably a title.

Ahaz, eleventh King of Judah (741–725 B.C.), being attacked on his accession by the kings of Israel and Syria, and also by the Edomites and Philistines, summoned to his assistance Tiglath-Pileser, King of Assyria, who exacted from him heavy tribute. *See* 2 Kings xvi., Isa. vii.

Ahaziah: 1. Son of Ahab and eighth King of Israel (896–894 B.C.), was, like his father, an idolator, and worshipped Baal and Astarte. When about to attempt to suppress the Moabites, who had revolted on his accession, he was fatally injured by a fall from a window. *See* 1 Kings xxii. and 2 Kings i. 2. Sixth King of Judah (885–884 B.C.), nephew of the foregoing, was killed in the insurrection which broke out under Jehu, the son of Nimshi. *See* 2 Kings viii., 2 Chron. xxii.

Ahimelech, Jewish high priest, who at Nob fed David with the shewbread and gave him the sword of Goliath, thus assisting him to escape from Saul (1 Sam. xxi. 1–10). He was put to death by Saul (1 Sam. xxii. 11–20).

Ahlen, tn. of Westphalia, Prussia, on R. Werse, 20 m. S.E. of Munster. The chief manufs. are linen and enamels. Pop. 22,250.

Ahlquist, August Engelbert (1826–89), Finnish philologist. After studying at Helsingfors, founded the news-

paper, the *Snomelar*, travelled extensively through N. Russia and Siberia, and in 1863 became professor of Finnish language and literature at Helsingfors. He pub. many works on philology, some poetry, and an account of his travels.

Ahlwardt, Theodor Wilhelm, Ger. orientalist, *b.* in 1828 at Griefswald, and studied there and at Göttingen, Gotha, and Paris. Became professor of Oriental languages at Griefswald in 1861. His works include *Ueber Poesie und Poetik der Araber*, 1856; *Diwan des Abu-Nowas*, 1861; *Divans of the Six Ancient Arabic Poets*, 1870; *Bemerkungen über die Echtheit der altarabischen Gedichte*, 1872; *Anonyme arabische Chronik*, 1883; *Sammlungen alter Arab. Dichter*, 1902–3; *Ruba's Diwan*, 1904. He also catalogued the Arabic MSS. in the Berlin Royal Library, 1887–99.

Ahmed I., Sultan of Turkey (1589–1617), succeeded his father, Mohammed III., in 1603. The most notable events in his career are the conclusion of the peace of Sitvatorok with Austria in 1606 and the unsuccessful war with Persia.

Ahmed II., Sultan of Turkey (1691–95), succeeded his brother Solyman II. His forces, under Kiuprili, were driven from Hungary after their bad defeat at Salankeman, 1691.

Ahmed III., Sultan of Turkey (1673–1736), succeeded his brother Mustapha II. The most notable events in his career are the war with Russia, the recovery of Morea from Venice in 1715, and the two defeats by the Austrians, at Peterwardein 1716, and Belgrade 1717. He was dethroned in 1730.

Ahmedabad, or Ahmadabad, city and dist. of India, in prov. of Gujerat, Bombay Presidency. The city, 350 m. N. of Bombay, on the Sabarmati R., was founded by Ahmed Shah in 1412. It was ceded to the East India Company in 1818, and suffered severely from earthquake in the following year. Though now in a state of decay, it retains many vestiges of its former magnificence, notably the Jama Masjid, or Great Mosque, built in 1824, the Ivory Mosque, the ivory interior of which is lavishly decorated with jewels, and the modern Jain temple. From 1573 to 1600 it is said to have been the handsomest town in Hindustan, perhaps in the world, and in spite of being one of the most important centres of the cotton trade with seventy-four mills employing 44,000 hands, besides its manufs. of pottery, paper, silk, and metal ware, it is still a most beautiful city. In 1615 it was 'a goodly city as large as London.' Pop. of city 274,007; dist. 890,911.

Ahmed Fuad, *see* Fuad, I.

Ahmednagar, or Ahmadnagar, city and dist. of India, Bombay Presidency. The city, situated 120 m. E. of Bombay, was founded in 1494 by Ahmed Nizam Shah. It was captured from the Mahrattas by General Wellesley in 1803, but restored to them. It was finally ceded to the British in 1817, by the treaty of Puna. Under British rule its prosperity has greatly increased and there is a large trade. It is the headquarters of the 11th Infantry Brigade, and there are an Armoured Motor centre and a Machine Gun School. It is an important mission centre. Pop. 49,878; of dist. 731, 552.

Ahmedpur, or Ahmadpur, tn., India, state of Bahawalpur, 30 m. S.W. of tn. of Bahawalpur. Has manufs. of cotton and silk. Pop. 30,000.

Ahmed Shah, first monarch of Afghanistan (1747–73), was the son of Sammaun Khan, chief of the Abdali tribe. After the murder of his master Nadir Shah, he retired to Afghanistan, where he was elected ruler. He was a fine soldier and greatly extended the Afghan dominion.

Ahriman (*angra mainyu*, literally 'the Destroyer'), the Spirit of Evil, opposed to Ormazd, the Principle of Good, in the Zoroastrian system. Warfare must be waged between the two for 12,000 years, at the end of which A. will be defeated by Ormazd. He is the source of evil, and has existed since the commencement of the world. *See* J. Darmesteter's *Ormazd et Ahriman*, 1877.

Ahuachapan: 1. Dept. in San Salvador, Central America. The fertile valleys of the Coast Range produce sugar, coffee, tobacco, cotton, and fruit. Pop. 64,000. 2. Cap. city of dept. of same name, 47 m. N.W. of San Salvador. Pop. 20,000.

Ahwaz, a Persian tn. on the Karun, 46 m. S. of Shuster. Remains of an anct. tn. are found near it, including those of a citadel of vast dimensions. Pop. 2000.

Ai (Heb., heap), a Canaanitish city E. of Bethel. Abraham pitched his tent between Bethel and Ai (Gen. xii. and xiii.), but the city is better known for its capture by Joshua in later times (Joshua vii. and viii.). Its ruins existed in the time of Eusebius and Jerome, but none are now to be found.

Aia-Solouk, or Aia-Saluh, erroneously supposed to occupy the site of Ephesus.

Aicard, Jean François Victor (1848–1921), Fr. author, *b.* at Toulon. His works, mainly poetical and dramatic, include: *Jeunes Cro*[illegible] 1867; *Au Clair* [illegible] *Rebellions et les* [illegible]; *Poemes de*

Provence, 1873; *La Vénus de Milo*, 1874; *La Chanson de l'Enfant*, 1876; *Midic et Nord*, 1880; *Lamartine*, 1883; *Jésus*, 1896; *Talas*, 1902; *L'Âme d'un Enfant*, 1903; *Légende du Cœur*, 1903; *Benjamine*, 1906; *Maurin des Maures*, 1908, and *L'Illustré Maurin*, 1909, both trans. by Alfred Allinson, 1910; *Alfred de Vigny* (Conférences, etc.), 1914; *Le Témoin* (poems), 1916; *Des Cris dans la mêlée*, 1916; *Le fameux chevalier Gaspard de Besse*, 1919; *Forbin de Sollies* (play), 1920; *Pages rétrospectives de la guerre sous-marine en Méditerranée* (c. 1923).

Aidan, St. (*d.* 651), a monk in the monastery of Iona, was in 635 sent by the abbot on the request of King Oswald of Northumbria to evangelise that country. Cormac, a monk previously sent from Iona on the same errand, had failed through his impatience and intolerance; but the saintly gentleness of A. brought forth much fruit, in spite of the opposition of Penda, heathen king of Mercia. A. was consecrated bishop, and estab. his see at Lindisfarne.

Aidé, Charles Hamilton (1830–1906), the son of an American who married the daughter of Sir George Collier, *b.* at Paris and entered the British army in 1845. As a poet he pub. *Eleonore*, 1856, and *Songs without Music*, 1882. His novels, which paint the polite society with vigour and fidelity, include *Rita*, 1859; *The Marstons*, 1868; *Passages in the Life of a Lady*, 1887.

Aide-de-Camp (Fr. camp-assistant), an officer attached to the personal staff of a general, with whom he is in confidential touch when on active service, assisting him in all the military routine. It is a position of grave responsibility and danger, since the A. carries all instructions to the various officers. The sovereign may have any number of As., and this position is given as an honorary distinction.

Aidin: 1. A vilayet or prov. in Asia Minor, known also as vilayet of Smyrna. Chief tn., Smyrna. Pop. of A., 2,500,000. 2. Important tn. in vilayet of Smyrna in valley of Menderes, near site of anct. Tralles. Has tanneries and large trade in figs and cotton. Pop. 70,307.

Aidone, tn. in Sicily in prov. Caltanisetta, on the Serra Orlando Mt. Near A. are extensive remains of an unknown city. Pop. 7,880.

Aids, under the feudal system, were payments due from vassal to lord under certain conditions.

Aigues Mortes (Lat. Aquæ Mortuæ), a small tn. in the Fr. dept. of Gard, situated 3 m. from the Mediterranean. Saint Louis made it a port and sailed thence in 1248 and 1270 for the Crusades. It is now of little importance. Pop. 4511.

Aiken, co. seat of Aiken co., S. Carolina, U.S.A., 17 m. E.N.E. of Augusta, Ga.; a health resort chiefly visited by Northerners, and seat of the Immanuel Training School for negroes. Pop. 4103.

Aikin, John (1713–80), *b.* in Scotland and studied at Aberdeen. He became divinity tutor at Warrington Academy, 1761–78.

Aikin, John (1747–1822), *b.* at Kibworth, Leicestershire, studied medicine at Edinburgh and London, later taking the degree of M.D. at Leyden, 1780. Besides practising at Chester, Warrington, and London, he wrote voluminously. Among his works are the well-known *Evenings at Home* (written in conjunction with Mrs. Barbauld) and his *General Biography*, 1799–1815.

Aikin, Lucy (1781–1864), *b.* at Warrington and *d.* at Hampstead. She wrote *Lorimer*, a novel, but her reputation rests mainly on her court memoirs (of a series of which the *Memoirs of the Court of Elizabeth* is the first) and her *Life of Addison*.

Aikman, William (1682–1731), portrait-painter, *b.* at Cairnie, Forfarshire. He was originally intended for the law, but followed his natural bent, and studied art at Edinburgh and abroad. He practised at Edinburgh under the patronage of the Duke of Argyll, and in 1723 removed to London, where he painted sev. famous portraits, including those of Gay and Thomson.

Ailanthus, or Ailanto, is a genus of tropical trees which belong to the Simarubaceæ. *A. glandulosa*, the tree of heaven, is cultivated in Britain; the leaves are like those of the ash. The wood is valuable to cabinet-makers.

Ailly, Pierre d' (1350–1420), Fr. theologian and prelate, was a famous leader of the Nominalists. He became chancellor of the University of Paris, bishop of Compiègne, and papal legate in Germany. He took part in the Council of Constance.

Ailsa Craig, a rocky islet of columnar basalt off the W. coast of Ayrshire, Scotland. It is in the form of a cone, and rises abruptly from the sea to a height of 114 ft. It has a lighthouse at the S. end.

Aimard, Gustave (1818–83), spent twenty years of his life in roving through Central America and Asia. He made use of the materials thus collected in writing novels of the Fenimore Cooper type, such as *Les Trappeurs de l'Arkansas* and *Nuits Mexicanes*. Many of these have been translated into Eng. See *Indian Scout*, Everyman's Library.

Aimoin, a Fr. Benedictine monk and historian, who *d.* in 1008. He wrote a history of the Fr. up to 654, and a life of Abbon, which gives an account of the manners and customs of the time.

Ain: 1. A Fr. riv. rising in the dept. of Jura, flowing through Jura and Ain into the r. b. of the Rhone, 18 m. above Lyons. 2. A dept. on the eastern frontier of France, very mountainous in the E. and marshy in the N. Area, 2245 sq. m. Pop. 317,195.

Ainger, Alfred (1837–1904), *b.* in London, graduated from Trinity College, Cambridge, in 1860. In 1866 he was appointed reader at the Temple Church, in 1877 canon of Bristol, in 1894 Master of the Temple. He pub. sev. works, but he is best known as

[illegible]

and various articles in the *Dictionary of National Biography*.

Ainley, Henry Hinchliffe, actor, *b.* Aug. 21, 1879, at Morley, nr. Leeds. While a bank-accountant at Sheffield became an amateur actor, and joined the profession on making acquaintance with (Sir) Geo. Alexander in that city. Toured at first with F. R. Benson; app[illegible]
at the Lyceun [illegible]
has played m [illegible]
and America [illegible]
Laertes, Johr [illegible]
Prospero, anc [illegible]
speare; and [illegible]
Gavin Dishart [illegible]
Captain Hook [illegible]
and the Bishop in Shaw's *Getting Married*. For a while he managed at St. James's, in succession to Sir Geo. Alexander.

Ainmiller or **Ainmuller, Max Emanuel** (1807–70), *b.* at Munich, where he was a glass-painter. Discovering various technical improvements, he extensively revived the art of glass-painting. His works include windows in St. Paul's Cathedral, London, and in Glasgow Cathedral.

Ainos (*ainu*, man), a dying race now found chiefly in the N. of the island of Y[illegible]
They were [illegible]
the countr [illegible]
tory tells c [illegible]
They are now very degenerate, and show few signs of intelligence. The Ainos are taller than the Japanese, strong, and very hairy, though there is no ground for the tradition that their bodies are covered with hair. Their cheek-bones are high, their noses flat and broad, and their faces short. They are chiefly conspicuous for their incredible dirtiness. They live on the products of fishing and the chase in wretched huts, scantily furnished. Their principal object of worship is the bear, though they pay no respect to the life of this animal, which they kill and skin without any fear, setting up its head in their villages. They believe, however, in a Supreme Creator and also in the immortality of the soul. Their religious

[illegible]

sequence extremely ignorant.

The As. differ in physique, language, and customs from the other Asiatic races. During the last century they have been much studied and the bibliography of the subject is considerable. *See* Rev. J. Batchelor's *The Ainu and their Folklore* (London, 1901); R. Hitchcock's *The Ainos of Japan* [illegible]; Miss Bird's [illegible] *Japan* (London [illegible] and Batchelor, *Aino Studies* (Tokio, 1887).

Ainsworth, Robert (1660–1743), *b.* at Woodvale near Manchester and *d.* in London. He was a teacher in Bolton, and at various places in London. His Latin-English dictionary was first pub. in 1735, and he also wrote *Proposals for making Education less Chargeable*, and other treatises.

Ainsworth, William Francis (1807–96), *b.* at Exeter, graduated in medicine at Edinburgh in 1827. He then conducted some geological researches in the Auvergne Mts. and the Pyrenees, after which he travelled for some years in Asia, visiting Kurdistan. On his return in 1838, he pub. *Researches in Assyria*, and later *The Claims of the Christian Aborigines in the East*, 1843, and *Travels in the Track of the Ten Thousand Greeks*, 1844.

Ainsworth, William Harrison (1805–82), historical novelist, *b.* at Manchester, where his father was a solicitor. He was to have followed the same profession as his father, but he had little liking for it. He came to London to finish his studies and met there Mr. John Ebers, a publisher who was manager at that time of the Opera House; he thus met a great number of literary and musical people, and his charming manners found him many friends. In 1826 he married the daughter of Mr. John Ebers, and worked for some time in his father-in-law's business. He gave this up soon and devoted the rest of his life to journalism and literature. His first successful novel was *Rookwood*, which came out in 1834, the hero of which was Dick Turpin, and from that time on to 1881 he pub. about thirty-nine novels. Some of these appeared in *Bentley's Miscellany*, *Ainsworth's Magazine*, and the *New Monthly*.

while he was editor of these papers between the years 1840 and 1853. Among his friends were Dickens, Thackeray, Talfourd, and Cruikshank, who often visited him at his home in Kensal Green. His best known novels are: *The Tower of London*, 1840; *Old St. Paul's*, 1841; *Lancashire Witches*, 1841; *Crichton*, *The Flitch of Bacon*, *The Miser's Daughter*, 1842; *Windsor Castle*, 1843. See *William Harrison Ainsworth and His Friends*, by S. M. Ellis, 1910.

Ain Tab, a tn. of Asiatic Turkey, vilayet of Aleppo. It was once an important military post, and is now a flourishing centre of American mission work. Trade, hides and leather. Pop. (Turkish, Armenian, and Greek), 45,000.

Air or **Asben**, a fertile but mountainous region of the Sahara, situated between lat. 17° and 20° N. and long. 7° and 10° E. The pop. consists mostly of Tuaregs. Cereals and dates are extensively cultivated, and vegetation is luxuriant. An important caravan passes annually through the tn. of Asben. A. is the most populous part of the Sahara. Chief tn. Agades.

Air, the atmosphere we breathe (*see* ATMOSPHERE); the characteristic or soprano part of a musical composition (*see* ARIA, MELODY); the bearing or manner of a person; in the plural, affected manners.

Up to the middle of the eighteenth century A. was thought to be a simple elementary substance, of which all other gases were modifications. Hence oxygen was first of all spoken of as 'dephlogisticated A.,' nitrogen as 'phlogisticated A.,' hydrogen as 'inflammable A.,' and carbon dioxide as 'fixed A.' The idea of modifications of the atmosphere is still preserved in the use of such terms as 'mountain A.,' 'sea A.,' etc.

A. is now known to be a mixture of gases, consisting approximately of four volumes of nitrogen to one of oxygen, with smaller quantities of carbon dioxide, water vapour, argon, helium, neon, krypton, xenon, ammonia, dust, sulphuric acid, etc., carbon dioxide, though present in small proportion (0·03 per cent. by volume), is nevertheless of great importance, as it forms the chief food of green plants.

A. may be liquefied and even solidified by the application of great pressure combined with an extremely low temperature (*see* LIQUID GASES). Compressed A. is used as a curative agent (see AEROTHERAPEUTICS), as an explosive or propellant (*see* AIR-GUN), as a dielectric in a form of *Leyden Jar* (*q.v.*), and as a motive power in various forms of machinery, such as the boring machines used in tunnelling through the Alps and elsewhere (*see* TUNNELLING).

Air-balloon, a term sometimes applied to balloons filled with hydrogen or coal-gas. The use of such a term owes its origin probably to the fact that the first balloons were distended by means of heated air.

Air-bath, an oven heated by gas or steam, used in practical chemistry for removing water from a substance.

Air-bed, a bed consisting of an envelope of rubber fabric distended with air. The bed is usually divided into compartments, into each of which air is pumped through a valve. When deflated, the bed can be folded up, so that it provides a portable as well as sanitary form of sleeping accommodation.

Air-bladder, or **Swimming-bladder**, a structure in some fishes which is filled with gas and serves as an organ of flotation. It occurs in the position occupied in air-breathers by the lungs, but is in most instances developed dorsally from the fore-gut, whereas the lungs are a ventral outgrowth. It is usually connected with the pharynx or the gullet by a duct, and therefore probably performs the duties of an accessory respiratory organ. It has been found that in a perch asphyxiated in stagnant water, the oxygen of the A. has been entirely replaced by nitrogen and carbon dioxide, although the normal proportion of oxygen is from 20 to 25 per cent. In some fishes the pneumatic duct is atrophied, so that the A. becomes a closed sac, whose function is entirely hydrostatic, that is, it serves to keep the specific gravity of the fish the same as that of the water. The gases in the bladder are compressed or rarefied as the fish is subjected to greater or less pressure by its varying position with respect to the surface, and the quantity of gas is regulated by absorption or secretion, so that the sp. gr. of the whole fish is properly adjusted. In some instances there is a connection between the A. and the auditory organ, probably giving the fish a consciousness of the variations of pressure.

Air-brake, a contrivance to decrease the speed of a train, or to bring it to rest completely, by the use of compressed air. In the simplest form of the Westinghouse A., a steam-driven air-pump compresses air into a reservoir placed under the footplate of the locomotive. The reservoir is connected by a three-way cock with the cylinder and piston actuating the brake-shoes in each coach throughout the train, the coaches being joined by flexible tubing. The brake is operated by turning the three-way cock so as to allow the compressed air from the

reservoir to act on the side of each cylinder necessary to drive the brake-shoes on to the wheels. The brakes are taken off by admitting compressed air to the other side of the cylinder. The improved form now in use has an auxiliary reservoir attached to each brake cylinder, with a triple valve connecting with the train-pipe. While the train is running the triple valve operates so that there is open connection between the train-pipe and the auxiliary reservoir and between the train-pipe and the brake side of the piston, whilst the compressed air is shut off from the cylinder. Any sudden diminution of the pressure in the train-pipe causes the triple valve to shut off the auxiliary reservoir from the train-pipe and discharge its compressed air into the cylinder, so that the brakes are applied. Thus, if by the parting of any coupling or by any other breakdown in the apparatus the air in the train-pipe escapes, the train is automatically stopped, as well as by the deliberate action of the guard or driver. The brakes are released by admitting the compressed air from the main reservoir to the train-pipe, by which action the valve operates so as to admit compressed air to the brake side of the piston, at the same time re-establishing the connection between the train-pipe and auxiliary reservoir, which is therefore recharged.

Air-chambers, in plants, are cavities in the leaves or stems, or other parts, containing air. They are present in the parenchymatous tissue at the angles of adjoining cells. They are particularly noticeable in aquatic plants, *e.g.* white water-lily (*Nymphœa alba*).

Air Council. Established by the ir Force (Constitution) Act, 1917, to dminister matters relating to the ir Force and to the defence of the ealm by air. It consists of one of he principal Secretaries of State, ho is president, a vice-president and arliamentary secretary, and other embers appointed according to the rovisions of Orders in Council made der the Act. In practice these her members include the chief of e air staff, the controller-general civil aviation, the finance member, director-general of supply and earch, with two additional members the permanent secretary of the Ministry. For some years the retary of State for War acted as Minister, but a Secretary of State Air was appointed independently ny other secretariat.

r-cushion, a pillow consisting of bber fabric envelope filled with The term is also applied to a e at the bottom of a lift shaft, used as a safety device in the event o the lift falling down the shaft. The sides of the coil are air-tight, so that the lift compresses the air as it falls into it, thus diminishing the shock of the impact.

Air-engine, a form of heat-engine in which the working substance is air. The essential parts of such an engine consist of a chamber placed so that one end can be heated by a furnace and the other cooled by a refrigerator. When hot the air is allowed to expand to push a piston; when it is cooled it is compressed to its original volume by pushing a piston back. The difference between the work done by the hot air in pushing the piston and that done upon the engine by pushing the piston back is the net work done by the engine. Carnot imagined an engine in which a volume, V, of air at a low temperature, T, was compressed until its temperature rose to *t* and its volume was reduced to *v*. It was then placed in contact with a source of heat whose temperature was also *t* and allowed to expand whilst its temperature remained constant; it was therefore necessary that heat should be abstracted from the source to account for the expansion. The air was then removed from the source and allowed to expand until its temperature fell to the original temperature T. It was then placed in contact with a refrigerator of the same temperature T, and compressed to its original volume, the temperature remaining constant, which means that a quantity of heat must be given out to the refrigerator. This was merely a theoretical engine, in which the difference between the quantity of heat taken from the source and that given up to the refrigerator indicated the amount of work done by the engine.

This principle was adopted by the Rev. R. Stirling, who invented in 1816 an A. in which a large plunger works in a cylinder, with a space at the top kept cool by a water-jacket, and a space at the bottom heated by a furnace. The distinctive feature of the engine is the 'regenerator,' a structure of thin metal plates or wire gauze, which connects the cold upper region with the hot lower region, so that the hot air in ascending may give out heat which may be taken in by the cold air in descending, thus supplementing the furnace and economising fuel. When the plunger is raised the cold air is forced through the regenerator to the bottom of the engine, becoming heated, and exerting pressure which serves to raise a motor piston. The plunger then falls; the heated air is forced up to the cold region, the pressure diminishes, and the motor piston falls. The whole work done by

the engine is the difference between the work done by the motor piston and that required to move the plunger. The theoretical efficiency of such an engine is high, but in practice it does not work out so satisfactorily. A double-acting engine of a somewhat improved type, the result of the collaboration of Robert Stirling with his brother James, was installed in the factory of the Dundee Foundry Company, where it was used for about three years; but repeated difficulties connected with the heating vessels eventually caused its abandonment.

In 1853 an American, Captain John Ericsson, fitted his ship, the *Caloric*, with an A. He used a regenerator, but experienced the same difficulties as his predecessors, and abandoned the attempt after two years' trial.

The more marked disadvantages of As. on the Stirling model are the great bulk of air used in engines of quite small power and the difficulty of transmitting heat to it. The surface to be heated is too large, there is great waste of heat through the chimney, and there is constant oxidation of the metallic envelope, owing to its being at a high temperature in contact with free oxygen.

Modern As. are usually of small power; they are, however, easy to work, and are especially suitable for pumping. Among them may be mentioned Messrs. Hayward and Tyler's 'Rider' hot-air engine. It has two cylinders and a regenerator consisting of thin iron plates. Coke is employed as fuel, and if the engine is used for pumping, the water may be utilised in the cooling-jacket. For a 1 h.-p. engine the consumption of coke is about 9 lb. per hour. In the 'Bailey' engine there is one cylinder, in which both the motor piston and the plunger work. The engine is very simple in construction, and requires little attention in working. In a Fr. hot-air engine, the 'Bénier,' the air is first compressed by an air-pump and then driven through the incandescent fuel. A valve prevents the escape of the air during the ascent of the piston; it is then exhausted, a portion being blown into a small space surrounding the motor-cylinder, which tends to keep the cylinder and piston cool. This engine is made to give as much as 20 h.p.

Air Force, Royal (R.A.F.). This, the youngest of the three services, was constituted by Act of Parliament in 1917 by amalgamating the Royal Naval Air Service and the Royal Flying Corps. These bodies were organised respectively by the Admiralty and the War Office, and rendered effective service during the Great War, but as from 1918 the amalgamated force was organised and controlled by the Air Ministry. Permanent commissions in the R.A.F. may be obtained either (i) through the R.A.F. (Cadet) College at Cranwell, or (ii) through a recognised University, and temporary commissions by direct grant of what is known as a 'short-service' commission. A limited number of short-service officers are selected periodically for transfer to permanent commissions. The cadet's course at Cranwell lasts for two years, during which time cadets are taught to fly. All cadets who successfully pass out of Cranwell receive permanent commissions, commencing with the rank of Pilot Officer. Promotion to Flying Officer comes normally after about twenty months' service, and promotion to all ranks above Flying Officer is made by selection. University candidates are gazetted to Pilot Officer rank with twelve months' seniority or eighteen months if the candidate graduated with first-class honours, and promotion to Flying Officer follows in six months. Officers are given the opportunity of studying some branch of engineering or science that has its counterpart in civil life. By this means an officer avoids the risk of becoming so far a specialist in the science of aerial warfare as to be unfitted for any civil avocation on retirement from the Force.

The present strength of the R.A.F. is approximately 35,500 of all ranks (3500 commissioned officers, 22,800 aircraftsmen, the remainder being cadets, apprentices, etc.). Units are made up of squadrons, groups, and wings. A single-engine squadron comprises three 'flights' of four machines each (peace estab.) or three 'flights' of six machines (war estab.). A twin-engine squadron consists of two 'flights' of five machines each.

'Group' is practically synonymous with 'wing,' but 'wing' is rather a war-time term denoting two or more squadrons, whereas 'group' is a peace organisation, larger than 'wing' in the sense that it comprises its ancillaries in the way of training schools, as well as its service squadrons. A 'brigade,' also a war-time term, comprises two or more wings, or at least four squadrons, *i.e.* forty-eight machines (peace) and seventy-two (war).

Since the Great War the onus of policing the mandated territories of Palestine and Iraq has fallen on the R.A.F. Many punitive expeditions against recalcitrant tribesmen have been carried out in Iraq and other parts of the Middle East during the last ten years.

Air-gun, a gun in which the bullet is propelled by the energy of compressed air. There are many forms, but usually there is an air-reservoir communicating with the barrel, which should be of small bore. The air is compressed by means of a spring, the trigger operates the valve, and the bullet is thereupon propelled by the elasticity of the compressed air. Most As. are capable of carrying a small bullet for a distance of about 60 to 80 yds.

The use of compressed air as a propellant in larger pieces of artillery has received much attention in America. In 1888 Capt. Zalinski, of the U.S. Artillery, introduced an effective pneumatic gun, from which shells charged with dynamite were propelled by air at 1000 lb. pressure, a store of which is carried in reservoirs attached to the gun. With a 1000 lb. shell the gun has a range of 2400 yds., and great accuracy has been obtained in guns mounted ashore. The shore defences of New York and San Francisco include some of these guns, their great advantage being that the shells can be timed to explode under water. An attempt was made to use them on a gunboat in the Spanish-American War, but without any striking success.

Air-lock, a chamber connecting the region of compressed air of a caisson (*q.v.*) with the outer atmosphere. When the outer door is opened to admit men or materials the air is at atmospheric pressure. The outer door is then shut and air pumped into the lock until the pressure is equal to that of the caisson, when the inner door is opened.

Air Ministry. The Ministry formed to administer the R.A.F. through the Air Council (*q.v.*). It is modelled somewhat on the organisation of the War Office, with departments under each of the principal members of the Air Council. For purposes of recruiting and organisation there are four area commands under its control, the Southern, the Midland, the Northern, and the Coastal Area, with headquarters at Uxbridge, Leamington Spa, York, and Kensington respectively. The A.M. is located in Kingsway, W.C.

Air-[illegible] liminishing or [illegible] of air in a cont[illegible]erm was origina[illegible]ances for producing a partial vacuum, but is now used without discrimination in connection with machines for producing a flow of air. The mechanism which provides a diver with a constant supply of air at a pressure proportionate to his depth in the water is called an A., and the term is also applied to machinery whose object is to provide a supply of compressed air.

The earliest device for exhausting air by means of a pump is associated with the name of Otto von Guericke. In 1650 he devised an apparatus for removing air from a vessel called a receiver, which is connected with a barrel in which a piston works. Both the connecting pipe and the piston are fitted with valves opening away from the receiver. As the piston is pushed in, its valve opens and lets out the air contained between it and the valve at the bottom of the barrel. When the piston is withdrawn, its own valve shuts, and the other valve opens to allow the air of the receiver to extend into the barrel. The air thus bec[illegible] stroke. [illegible] do not r[illegible] The difficulty of working increases as the difference of pressure within and without the receiver increases; there is usually constant leakage at the valves, and when the process of exhaustion has reached a certain point, the pressure of the air left in the receiver is not sufficient to open the valves. An improvement was instituted by Papin and Hawksbee, who used a pump with two barrels, thus shortening the process of exhaustion. In Hawksbee's A. each piston is worked by a rack and pinion, and owing to the fact that one piston works with the pressure of the atmosphere as the other works against it, the difficulty of working as exhaustion proceeds is not increased.

In Tate's A. there is a single barrel with a double action, the piston consisting of two discs joined together, forming essentially a piston just less than half the length of the cylinder. There is [illegible] each end [illegible] is in the r[illegible] by both the forward and backward strokes of the piston.

A pressure gauge is usually attached to these pumps, consisting of a bent glass tube containing mercury, one end of which is closed, thus forming a kind of barometer. The closed portion, however, need not be 30 in. long, as it is seldom necessary to know the pressure inside the receiver until it is considerably less than that of the atmosphere.

The progress that has been made in modern electrical research and in its practical applications during the last thirty years has only been made possible by an enormous improvement in the design and technique of A. The modern 'high-vacuum' pump is capable of producing a pressure as low as a thousand-millionth of an atmosphere, which is the order

of the pressure in a wireless valve and the modern Coolidge *X*-ray bulb. There are two types of such pumps: (1) the Gaede or molecular pump, (2) the Langmuir, or mercury vapour pump.

The principle of the former is as follows: Inside a fixed cylinder there is mounted a concentric cylinder of a diameter only slightly less than the outer one. The latter cylinder can be rotated very rapidly about its axis by means of an electric motor. In the outer cylinder there are two outlets, one (A) communicating with the vessel to be evacuated and the other (B) is connected to a low-pressure chamber, *i.e.* one in which the pressure has been reduced to about $\frac{1}{1000}$ of an atmosphere by means of an ordinary air pump. The movable cylinder rotates from A to B, and as its periphery is moving with a high velocity, comparable with that of the molecules, a one-way molecular traffic is set up in the direction from A to B, and the pressure in the vessel connected to A decreases very rapidly to the extremely low value mentioned above. It may be recalled that in the common filter pump a stream of water rushes past an outlet and drags the air from the tube connected to the funnel containing the liquid to be filtered. Langmuir's pump ingeniously adopts this principle, but with this difference: the stream is a stream of mercury vapour from mercury boiled under reduced pressure and it rushes past an outlet connected to the vessel to be evacuated, thus dragging molecules of the air along with it. The stream of mercury vapour and air is then immediately cooled; the mercury condenses and returns as liquid mercury to the boiling chamber and the air passes on to be carried away by an ordinary A. The efficiency of both these pumps, especially the latter, is truly remarkable.

Air Raids.—The inviolability of the shores of Great Britain guaranteed by the supremacy of the seas was to a limited extent disturbed in the Great War by enemy attack from the air. The attacks were made in 1914. In 1915 German airships of the Zeppelin type raided Norfolk, Northumberland, Essex, Suffolk, Yorks., East London and the Home Counties. The attacks were repeated in 1916 and extended to the Midland Counties, as well as to Lincs., Leicester, Durham, Cambs., Hunts., Notts., and as far W. as Cheshire and as far N. as Scotland. In 1917 and 1918 airship raids were very rare, and ceased altogether after April 1918, the losses sustained by the raiders rendering such mode of attack abortive. Some Ger. airships were brought down in flames in England, and in Oct. 1917 only four out of eleven returned safely to Germany, the other seven being wrecked over France and the Mediterranean. The number of airship raids was approximately fifty, and according to the best available estimates the casualties among civilians in killed were 217 men, 171 women, 110 children; the injured numbered 587, 431 and 218 respectively. Fifty-eight sailors and soldiers were killed and 121 injured.

Ger. aeroplane raids began in Dec. 1914, over Dover and other parts of Kent. There were four raids over the E. Counties in 1915, sixteen over E. and Home Counties in 1916, twenty-seven over E. and Home Counties and London in 1917, eight in 1918, mainly over Kent, Essex, and London, the last being in June over Kent. The total casualties from these aeroplane raids were: among civilians, killed, 282 men, 195 women, 142 children; injured, 741, 585, and 324 respectively; military personnel 238 killed and 400 injured. No county was more raided than Kent, though Essex suffered severely. No fewer than 213 civilians were killed and 615 injured in two raids over Margate, Essex and London on June 13 and July 7, 1917. By 1918 the R.A.F. had established a definite superiority over raiders, and this fact, combined with the pressure on the W. Front, which necessitated the retention of Ger. machines over the lines, caused these raids to cease altogether nearly five months before the end of hostilities. The last air raid on London was on May 19, 1918, this being the twenty-fifth raid on the capital, the principal damage during the whole period being done in Bethnal Green, Peckham, Lewisham, Lower Sydenham, Kilburn, Rotherhithe, City and Poplar. In the City the most disastrous raid was that in which explosive bombs were dropped on the Central Telegraph Office. For the rest anti-aircraft guns and defensive planes kept the raiders too high to permit of damage to railway centres or points of military importance. Many bombs were dropped on Paris in the course of numerous raids, over 400 persons being killed and twice that number injured. In the first months of the War, the Allies only employed aircraft for reconnaissance work, for the direction of artillery fire, and for bombing the Zeppelin sheds of Düsseldorf or military positions. The Germans, however, initiated the policy of bombing open or undefended towns with the object of instilling terror into the inhabitants, but without any marked effect. By

way of reprisal the Allies in the later stages of the War effected numerous raids into Germany, especially in the Rhine provs. Later, the R.A.F. organised and carried out raids of increasing intensity as far as Frankfort and Stuttgart, and a great raid on Berlin with bombs weighing 3000 lbs., would have been attempted but for the signing of the Armistice.

Air Records. *See under* AERONAUTICS:

much more complete than in other vertebrates. In most cases they communicate with spaces in the bones, rendering them pneumatic, and thus serving to lower the specific gravity of the bird. As. are also found in the chameleon. These also are a complication of the lungs, and can be inflated, increasing the bulk of the animal.

Airships, a form of aircraft consisting of a torpedo-shaped envelope sustained in the air by being filled with gas, either hydrogen or helium. Although the idea of As. is old, it was not until the eighteenth century that serious consideration was given to them, when experiments were made in France, and continued there solely until Count von Zeppelin conducted them in Germany from 1898. The main difficulty of the pioneer work was expense, chiefly due to the size of the vessel, whence the slow development of As. compared with aeroplanes. Further, this difficulty limited, and still limits, practical interest in the with large Before the had done many. A few non-rigid As. had been as *Nulli* until Ger. authorities, and the ill-fated *Mayfly* was built. This was Britain's first rigid A., but it met with disaster on its trial flight. When the Great War broke out, Germany was well in advance of any other country, a fact which was demonstrated very clearly in their early air raids over England, and which made the British Government again turn its attention seriously to them. In 1915 a number of non-rigid As. had been built for anti-submarine work. By a stroke of fortune the German *L. 33* was brought down in England in Sept. 1916, in such a condition that it was possible to copy her design successfully in the British *R. 33* and *R. 34*, completed in 1919. Under the Treaty of Versailles Germany was forbidden to maintain As. of over 1,000,000 cu. ft. capacity. Consequently she disposed of these As. in part payment of reparations to the Allies. In May 1926, however, this limitation was removed. Great Britain has, since the War, constructed a few As. notably the *R. 100* and *R. 101*. The *R. 34* has also successfully crossed the Atlantic both ways (*see* ATLANTIC FLIGHTS). The Imperial Conference has also decided that A. routes are to be prescribed between the various parts of the British Empire.

From Germany U.S.A. received the *Los Angeles*. Since the war the U.S.A. suffered a serious accident by the loss of the A. *Shenandoah*. This, however, did not retard development, it being accepted as 'part of the price which must inevitably be paid in the development of any new and hazardous art' (American Court). The U.S. have now built mooring-masts across America. It has been found that operating As. from their sheds limits their use, an obstruction which has been overcome by the use of such masts. As regards the comparative advantages of helium and hydrogen, helium is cheaper than hydrogen and

it was this consideration which resulted in the loss of the *R. 101*, Oct. 5, 1930—one of the worst disasters in the whole history of aeronautics. The *R 101* had started on an official flight to India, but came down at Beauvais, France, on the same night, and was totally destroyed by fire, forty-eight of the company of fifty-four being burnt to death, including Lord Thomson, Secretary of State for Air, Air-Marshal Sir Sefton Brancker, and Major the airship. A., by reas a new cent had thereb gate, a difficulty gravely accentuated by the inclement weather which gloom -eight had rendered military honours to their remains, were accorded a public funeral in London. *See also* BALLOONS.

Air Survey. A.S. by British cartographers were rare before the War. Ger. maps were relied upon to a certain extent in the War, but really good orographical maps of foreign terrain, *e.g.* Gallipoli, Ger. E. Africa, etc., were not in existence. Air Surveys since the War have gone some way towards supplying the deficiency. In 1928 elaborate plans for survey by aerial photography of unmapped or only partially-mapped

regions in the Colonies and mandated territories were made by the British Government. The N. Rhodesian administration employed the Aircraft Operating Company to make an A.S. of the Zambesi waterway in Barotseland; including the Lungwo-Bungu R. and the Kabompo R. up to the Lungu confluence. The same Company supplied the N. Rhodesian Government with maps made from aerial photographs of the highly mineralised area near the N. Rhodesia-Congo boundary. The Air Survey Company recently completed a survey of the Rejang delta in Sarawak for the Government of that State, and also surveyed some 1700 sq. m. of territory for the British Malayan Petroleum Company, in Sarawak and Brunei. Similarly, the Iraq Government recently concluded a contract with a British firm for an A.S. of certain lands in Iraq.

Air-valve, an arrangement to prevent the compression of air where there is a bend in line of water-pipes. When the pipes are filling with water the driving of the air to the upper part of the bend might cause sufficient compression to stop the flow, if it were not allowed to escape. The valve is closed by a guided float if the water itself reaches to the top of the bend.

Air-vessel, a chamber interposed between the pump and delivery pipes in single-acting pumps. The air in the chamber is compressed at each forward stroke of the pump, thus providing a pressure which serves to drive the water on during the backward stroke. As the water tends to absorb the air, the latter must be replenished from time to time.

Air-vessels, in plants, are vessels of either parenchymatous or prosenchymatous tissues which have lost their living contents and become filled with air. They are very plentiful in pith, which is formed of thin-walled parenchyma, *e.g.* elder pith.

Aird, Thomas (1802–76), *b.* at Bowden, Roxburghshire, and educated at Edinburgh University, was the friend of Carlyle and Hogg. His literary works, though praised by Carlyle, have never become popular. The best known is his poem *The Devils' Dream*.

Airdrie, tn. of Lanarkshire, Scotland, on the high road between Edinburgh and Glasgow. The development of coal and iron mines in the vicinity has caused great increase in its prosperity during the last century. Cotton-weaving and paper-making are also carried on. It unites with Lanark in sending one member to the House of Commons. Pop. 25,093.

Aire, *see* LANDES.

Aire, *see* PAS-DE-CALAIS.

Aire, *see* YORKSHIRE.

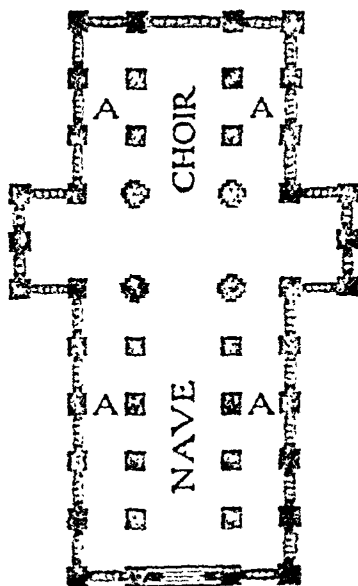
Aire-sur-Lys, tn. in the dept. of Pas-de-Calais, France, at the junction of three canals with the R. Lys, has a large trade in agric. produce. The chief building is the anct. Gothic church of St. Peter.

Airlie, David Stanley William Drummond Ogilvy, Earl of (1856–1900), 8th Earl, served in Egypt in 1882 and 1885. He met his death on June 11, 1900, at the head of his regiment, the 12th Lancers, when serving in the Boer War.

Airolo, a vil. of Switzerland, canton of Ticino, at the southern end of the St. Gothard railway tunnel. Elevation 3800 ft. A bloody battle was fought here between the Fr. and the Russians in 1799. The tn. was almost destroyed by an avalanche in Dec. 1898. Pop. 1600.

Airy, Sir George Biddell (1801–92), an Eng. astronomer, *b.* at Alnwick and entered Trinity College, Cambridge, in 1819. After a brilliant college career, he was elected Plumian professor of astronomy in 1828. In 1836 he was appointed Astronomer Royal at Greenwich Observatory, where he made important researches in magnetism, meteorology, etc. Among his works are *Astronomical Observations, Tides and Waves*, 1842; *Ipswich Lectures on Astronomy*, 1851; *Treatise on the Errors of Observation*, 1861. Fuller information may be found in his *Autobiography*, 1896.

Aisle (Fr. *aile*, Lat. *ala*, a wing),



AISLE

any ateral div. of a church or other

edifice. Generally in England there is only one aisle on each side of the nave, but on the continent there are sometimes as many as three.

Aisne (Lat. Axona): 1. A Fr. riv. rising in the Meuse dept. and flowing into the Oise near Compiègne. Length, 170 m. 2. A dept. in the N. of France. Surface, flat and undulating; soil, good; climate, damp and cold; cereals are generally cultivated. There are important woollen manufs. The dept. is watered by the Marne, Oise, and Aisne. Cap., Laon.

Aisne, Battles of the. The valley of this riv., extending as it does from Compiègne and the vicinity of Noyon, through Soissons and the Department of the Meuse to the Argonne forest and to within 25 m. of Verdun, was foredoomed to be the scene of bitter fighting in any war in which the Ger. Armies should invade France from the N.E. This proved to be the case, though the character of the fighting was, no doubt, very different from what was contemplated by the General Staff of either side. There were three Battles of the Aisne, fought respectively in 1914, 1917, and 1918, but the British Armies were not especially involved in the second battle, which began a few days after the British attack at Arras had closed.

First Battle of the Aisne.—The advance to the Aisne began with the allied victory of the Marne on Sept. 6, 1914, and continued until Oct. 1. When conditions stabilised, the trench warfare, which was to endure for four years, began. So far as the British Army was concerned, this warfare was improvised, for the only heavy guns it had were a few batteries of old 6-in. howitzers and but meagre engineering stores. The compilers of the British 'Official History of the War,' conclusively refute the assumption that entrenchments had already been prepared on the Aisne heights in anticipation of retreat. On the contrary, when this, the so-called race to the sea, began, there was a moment when a real gap rawned between the Ger. First and Second Armies covered only by Ger. avalry; and the British First Corps, nder Haig, was thrown into the ttack with every prospect of success, but vainly as it turned out, ecause before the attack could be lly launched, the Ger. reserves, hich were too late for the Marne attle, reached the gap and closed it. deed, no one had foreseen the deadk which now ensued, nor envisaged e implications of scientific progress the art of modern warfare whereby hope of outflanking a line which ld seemingly be endlessly extended finally dispelled and the long routine of dreary trench figh without tangible results set in. S deadlock was certainly no part the original Ger. plan, though natural advantages of the regions the Chemin des Dames, and t forests of St. Gobain and the Argon had suggested the provision of e trenchments in the rear in case retreat. The Allied forces continue their frontal attack in the vain expectation of outflanking the Ger. line but as the battle proceeded, found that the Germans were but fighting rearguard actions to cover their further and leisured retirement.

The actual battle began on Sept. 13, the Germans being then N. of the riv. with their guns concealed on the N. slopes. Despite the depth of the riv., Maunoury with the 6th Army, attacking on the left from Compiègne, succeeded in getting several divisions across; the British Army sustained the general attack from the point of junction with the Fr. at Soissons for a distance of 15 m. On the 14th, Maunoury captured Nouvron and attacked the heights only to find, as did the British after capturing Troyon, that the enemy positions on the high ground were invulnerable. On the 15th the Germans, counter-attacking, drove the Fr. from Nouvron and the British back to the riv. Marshal Joffre, who was then in supreme command, then began a change of strategy, lengthening his left by forming two new armies, but the only result of this collision of equally balanced forces was to force them out westward and the same result ensued in the opposite direction when the Germans sought to outflank General Sarrail on the Meuse.

Second Battle of the Aisne.—This battle was begun on April 16, 1917, by General Nivelle by attacking the 'Hindenburg Line' near Laon. His strategy was the antithesis to that of Joffre, whom he had succeeded, namely to deal a decisive blow rather than to wear down the enemy by attrition. He actually endeavoured to storm the Aisne heights in one supreme attack launched from three quarters simultaneously with the whole of his forces, the main offensive being in the vicinity of the lower ground before Laon. He captured the riv. banks from Soissons to Berry-au-Bac, together with 20,000 prisoners and nearly 200 guns, but he found the road to Laon impregnable. His disastrous strategy caused a reaction to the Fabian tactics of Foch and Petain, the latter being appointed generalissimo in his stead, and once more the Allied armies settled down to the more effective if protracted

method of a war of attrition, in which the side which should eventually receive heavy reserves at the decisive moment would of necessity win the day.

Third Battle of the Aisne.—This battle was part of the Ger. offensive in Champagne, which extended between May 27 and June 6, 1918, the geographical limits, so far as the British forces were concerned, being between the Chemin des Dames and the Montagne de Reims, E. of Verneuil. Ludendorff had recently held out hopes to Germany of a supreme and decisive effort before the American Armies could be thrown into the fray, inasmuch as he had driven a deep salient into the British lines near Arras and the Ger. effectives still outnumbered those of the Allies. There was some justification for the high hopes entertained in Germany as to the outcome. The offensive against the Fr. was begun on the Aisne heights, this being the zone nearest to Paris and the Marne and the Paris-Châlons railroad. The Ger. preparations were made with despatch and secrecy, and on May 27 the preliminary artillery bombardment began all along the line from Ailelle to the environs of Reims. Before the day was over, the Fr. had retreated from the heights N. of the riv. and the Ger. troops under General von Boehn had crossed the riv. at Fismes, capturing numerous prisoners, guns and other booty. Flushed with success, the Ger. command deepened its thrust from Fismes right to Château-Thierry on the Marne; but never for an instant did Marshal Foch allow his major strategy—the strengthening of his flank positions at Reims and Soissons—to be distracted, and before long the tide was destined to turn. (*See also* MARNE, BATTLES OF.)

Aissé, Mademoiselle (c. 1694–1733), Fr. letter-writer, *b.* in Circassia, captured by Turks, and sold in 1698 as a slave to the Comte de Ferriol, Fr. ambas. at Constantinople, who had her educated in Paris. She attracted much attention by her beauty and romantic story. *D.* in Paris. Her letters to Madame Calandrini, first pub. 1787, with notes by Voltaire, are of great interest and fidelity. Other eds. appeared in 1846, by S. Ravenel, with an introduction by Sainte-Beuve, and in 1873, by E. Asse. *See also* her *Life* by Courteault (Maçon, 1900).

Aistulf, or Astolf, King of the Lombards 749–56, succeeding his brother Rachis. Captured Ravenna and the Pentapolis 751–2, and marched against Rome. The pope called to his aid Pepin, King of the Franks, who defeated Aistulf in 754. Aistulf again besieged Rome in 756, and was forced by Pepin to give up the exarchate of Ravenna and the Pentapolis to the pope. *See* Gregorovius, *City of Rome in the Middle Ages*, vol. ii., 1896.

Aitchison, Sir Charles Umpherston (1832–96), Indian statesman. He was much opposed to Lord Lytton's policy, leading to the second Afghan war. In 1878 he became chief commissioner of British Burma, in 1882 lieutenant-governor of the Punjab, in 1887 member of the Supreme Council, and was president of the Public Service Commission 1887–8. Retired 1888; *d.* at Oxford. Compiled *Treaties, Engagements, and Sunnuds*, 1862–92, and wrote *Native States of India*, 1875, and a life of Lawrence.

Aitken, James (1752–77), known as 'John the Painter,' was apprenticed as house-painter in Edinburgh, but came to London and turned highway robber. He was concerned in the tea-duty riots at Boston, U.S.A., set fire to some storehouses at Portsmouth and Bristol when the fleet was about to sail for America, and was executed 1777.

Aivazovski, Ivan Konstantinovitch (1817–1900), Russian painter, *b.* at Feodosia, studied as imperial pensioner at Academy of Art, St. Petersburg. His pictures are mainly marine and taken from Russian naval history.

Aiwalik, or Aivalik, is a seaport on the Gulf of Edremia, Asia Minor, N. of Smyrna. It was burnt by the Turks in 1821, but was soon rebuilt, and exports oil, olives, and corn. Pop. 30,000.

Aix, a tn. in the dept. of the Bouches du Rhone, France, the former cap. of Provence. Here C. Sextius Calvinus, the Rom. proconsul, founded a colony 120 B.C., giving it the name of Aquæ Sextiæ, on account of its mineral springs. It is a handsome tn. and contains the cathedral of St. Sauveur, the Palais, Museum, and Library, besides a university and school of art. It is the see of an archbishopric, does a considerable trade in olives, oil, and wine, and is engaged in cotton-spinning and tanning. Pop. 29,983.

Aix, a fortified is. opposite the mouth of the Charente, France. Here the Fr. were victorious over the British 1806, and there was an indecisive naval battle 1809. Napoleon on board the *Bellerophon* surrendered to the British, 1815.

Aix-la-Chapelle (Ger. Aachen), an important cathedral city in Rhenish Prussia, 40 m. W.S.W. of Cologne. In 1668 a Peace, signed at A., terminated the Franco-Spanish

war; the second war of the Austrian Succession was ended there by a treaty (1748); and in 1818 a congress met there to settle the disposition of Europe after the Napoleonic wars. The cathedral was begun by Charlemagne in 796. Under its dome is his tomb, opened in 1000 and found to contain the emperor's body, imperially robed and seated on a marble throne, his remains are now in a shrine. Its industries include cloth and silk manufacture, iron-works, chemicals, and wire. The sulphur springs are much patronised, some are of 136°. The city has prospered since 1815, owing to the neighbouring coal-mines. Pop. 155,296.

Aix-les-Bains, a tn. in Savoie, France. In the time of the Romans it was called Aquæ Allobrogum, and Aquæ Gratianæ or Domitianæ. It is situated in a healthy valley, and its hot springs attract many visitors. Pop. 9000.

Aizani, *see* AZANI.

Ajaccio, cap. of the Fr. dept. of Corsica, is situated on the W. coast of that is., on the N. of the Gulf of Ajaccio. The house in which Napoleon I. was born (1769) is still preserved as national property. The chief employments are the anchovy and pearl fisheries, while much olive oil is exported. The city has a fine harbour and cathedral. Pop. 22,614.

Ajaigarh, a hill fort of India, giving its name to a state, in Bundelkhand. It was captured by the British in 1809. It contains the ruins of sev. temples covered with sculptures.

Ajalon, the modern Yalo, is mentioned in Biblical history as the scene of Joshua's defeat of the Canaanites, when he made the sun and moon stand still till the victory was complete. It was given to the tribe of Dan.

Ajan, the name of that part of the E. coast of Africa extending from Magadoxo northwards to Cape Guardafui. It is the anct. Azania of the Gks.

Ajax, son of Oïlus, sometimes called the lesser A., sailed against Troy in forty ships. On his homeward journey his vessel was wrecked, but he escaped to a rock, and boasting that he would be saved, Poseidon split the rock and A. perished (Homer, *Odyssey*, iv.). Virgil tells us that he excited the anger of Athena (*Æneid*, i.).

Ajax, son of Telamon, sometimes known as Ajax the Great, was one of the most renowned heroes of the Trojan war. He engaged in single combat with Hector (Homer's *Iliad*, book vii.), and defended the ships and killed many Trojans (*Iliad*, books i.–xvii.). He contested with Ulysses for the armour of Achilles, and when it was awarded to Ulysses. A. killed himself (Sophocles, *Ajax*; Ovid, *Metamorphoses*).

Ajmeer, an important city of British India, in the prov. of Rajputana, 220 m. S.W. of Delhi. It is situated at the foot of Mt. Taragurh in a picturesque valley; many of the streets are spacious with fine temples. It contains the tomb of the Mohammedan saint Kwaja, much frequented by pilgrims, and is the cap. of the prov. of Ajmeer-Merwara. Pop. 113,512.

Ajodhya, of which the glories are described in the Ramayana, was the anct. cap of Oude, and was situated on the r. b. of the Gogra near Fyzabad. Its ruins alone remain, overgrown with jungle. The modern tn. of the same name is chiefly notable for the annual fair of Ramnani, which attracts 500,000 pilgrims.

Ajuruoca, tn. of Minas Geraes, Brazil, on riv. of same name, 107 m. N.E. of Rio de Janeiro. The industries of the dist. are stock-raising and the growing of tobacco, manioc, sugar, millet, and coffee. Pop. 15,000.

Akabah: 1. An Arabian tn. on the E. side of the Gulf of A., which has been identified with the Biblical Elath. 2. A gulf formed by a branch of the Red Sea between the peninsula of Sinai and the N.W. of Arabia. It is the anct. Alana.

Akashi, tn. of Harima, Hondo Is., Japan. A seaside resort and the meridian from which Japanese time is regulated. Pop. 21,196.

Akassa: 1. Riv. of Morocco, also called Nun, flowing W. into the Atlantic near Cape Nun. 130 m. long. 2. Station of Royal Niger Company on the mouth of the Nun entrance to the Niger, at which transhipment from ocean to riv. steamers takes place.

Akbar (the 'great,' his proper name being Jelal-ed-din-Mohammed) was *b.* at Amarkot in 1542, when his father was fleeing to Persia from Delhi. He was the wisest and greatest of the Mogul emperors. In 1555 his father regained the throne, but *d.* in the same year. A. committed the care of the kingdom to a regent, Bahram Khan. At that time few of the provs. originally subject to the Mogul emperors were in submission, and Bahram reduced many of them. However, he was despotic and cruel, and in 1560 A. took the rule into his own hands. In ten or twelve years he had conquered all India N. of the Deccan, and was able to devote himself to administration. His name as a ruler is inseparable from that of his minister, Abul Fazl, who later left an enduring record of the emperor's name in the Akbar Nameh. The pair ruled with wisdom and vigour, repressing vice with a firm hand. Roads

were made, and commerce was encouraged in every way.

A.'s reign marks the beginning of a new epoch, and is one of the most important periods in the religious and literary history of India. A. was not firmly attached to the Mohammedan faith, and called for Portuguese missionaries from Goa to explain Christianity to him. Ultimately he adopted an eclectic kind of Deism, while allowing religious liberty to his subjects. He encouraged literature and estab. schools throughout the country. *See* G. B. Malleson's *Akbar* ('Rulers of India' series), 1890.

A' Kempis, Thomas, *see* KEMPIS.

Akenside, Mark (1721-70), was *b.* at Newcastle, and in 1739 was sent to Edinburgh with the object of studying theology for the Presbyterian ministry. A year later he gave up this object for the study of medicine, and in 1744 took his degree of M.D. at Leyden. On his return he practised in Newcastle, Hampstead, and finally London. His haughty and pedantic manner (satirised by Smollett in *Peregrine Pickle*) prevented him from gaining a large practice. His profession, indeed, would hardly have supported him had not his friend Dyson made him an allowance of £300 a year. He had pub. verses in the *Gentleman's Magazine* as early as 1737, but his literary reputation rests on his *Pleasures of the Imagination*, commenced in 1737 and pub. in 1744. Its didactic nature made it popular at the time; it was approved by Pope and tolerated by Gray. A. also wrote various medical treatises on dysentery. *See* his *Life* by Bucke (London, 1832).

Akerblad, John David (*c.* 1760-1819), *b.* at Stockholm and *d.* at Rome. He was a Swedish archæologist and orientalist, distinguishing himself by his researches in Runic, Phœnician, Coptic, and hieroglyphic literature.

Akerman, *see* CETATEA ALBA.

Akers, Benjamin Paul (1825-61), American sculptor, was for a time in a printing-office. He then passed to painting, and finally to sculpture. He twice visited Italy, and it was during his second visit at Rome that his best works were done. Particularly notable are his 'Una and the Lion' and the 'Dead Pearl Diver.' He also executed busts of many distinguished Americans.

Akers-Douglas, Rt. Hon. Aretas, *see* CHILSTON.

Akhalzikh, or Akhaltsikh, a tn. in Russian Caucasia, on the Poskhov-Tchai, a trib. of the Kura. It has a considerable trade and the pop. (16,000) is mostly Armenian.

Akhissar ('white castle'), a tn. in Asiatic Turkey, 50 m. N.E. of Smyrna. It was the anct. Thyatira, one of the seven churches spoken of in the Apocalypse. It exports cotton, wool, etc. Pop. 12,000.

Akhlat, a tn. of Asiatic Turkey, on N.W. shore of Lake Van, 203 m. S.E. of Trebizond. Formerly the seat of the Armenian kings. Pop. 5000.

Akhmim, tn. of Upper Egypt, on Nile, 85 m. S.E. of Assiut. A steamboat and mail station, and long famous for textile manufs. Pop. 25,000.

Akhnaton, or Akhenaton, Pharaoh of Egypt of the eighteenth dynasty, succeeding his father, Amenophis III., as Amenophis IV. His reign was marked by religious fanaticism, the worship of all other gods being abolished in favour of the sun-god. He was especially opposed to the god Ammon, erasing his name from all monuments and abandoning Thebes for a new cap. at El Amarna, dedicated to Aton, the sun-god. He neglected other affairs, and his reign marks the end of Egyptian rule in Syria. He died *c.* 1350 B.C., after reigning about seventeen years. *See* *Life and Times of Akhnaton* (1910), A. E. P. Weigall.

Akhtirka, tn. of Kharkov, Russia, on a small trib. of the Dnieper and 58 m. N.W. of the tn. of Kharkov. Pop. 23,499.

Akiba, Ben Joseph, an influential Jewish rabbi, who *fl.* in the second century A.D. He was president of the school of Bene Barek, near Saffa, and laid the basis of the 'Mishna.' He joined the rebellion of Barcochebas, and was executed by the Romans, 135.

Akka: 1. A pygmy negroid race inhabiting the African equatorial belt. The A. (Arab, Tikki-Tikki) are found along the upper course of the Aruwimi and W. of the Albert Nyanza, and were discovered by Schweinfurth about 1872. They are yellow-brown in colour, and about 4 ft. 6 in. high, and live nomadically, apart from, though usually under the protection of, the taller races. 2. A vil. of the Sahara on the Moroccan border; one of the stations on the Morocco to Timbuctoo caravan route. 3. Anct. name of Acre (*q.v.*).

Akkad, an anct. Babylonian city, the name being later applied to a district. Mesopotamian monarchs bore the title of 'King of Akkad and Shumer.'

Akkerman, *see* CETATEA ALBA.

Akmolinsk: 1. A prov. in W. Siberia, in the gov. of the Kirghiz Steppes. Lying between the rivs. Uln-Tai and Ishim on the W. and Irtysh on the N.E., it is rather larger than Germany, and has a pop., largely nomadic, of about 800,000. It may

be divided into three parts: the northern, a low brackish plain; the central, occupied by the Tarbagatai Mts., containing gold, copper, and coal, and interspersed with fertile valleys; and the southern desert. The chief industries are agriculture, cattle-rearing, and transport. 2. Cap. tn. of prov., on R. Ishim, 300 m. S.W. of Omsk. Pop. 15,000.

Akola, tn. in dist. of same name, West Berar, India, on R. Morna, 55 m. S.W. of Ellichpur. The headquarters of the British commissionership of West Berar. Pop. 37,000.

Akot, tn. in Akola dist., West Berar, India, 35 m. S.W. of Ellichpur. It has a large trade in cotton. Pop. 18,000.

Akreyni, tn. of Iceland, on Eyjafjord. It has a good harbour and is an important trading centre. Pop. 1800.

Akron: 1. Cap. city of Summit county, Ohio, on Ohio Canal, 38 m. S. of Cleveland, containing numerous factories and mills. Pop. 253,653. 2. Tn. in Erie county, New York; manufs. cement; pop. 1960. 3. Tn. of Plymouth county, Iowa, containing large flour-mills; pop. 1324.

Aksakov, Constantin (1817–60), Russian writer, brother of Ivan, *b.* at Moscow; *d.* at Zante, Greece. His works, historical and philological, were collected and pub. in five volumes, 1861–80.

Aksakov, Ivan (1823–86), Russian writer and leader of Pan-slavist movement. Took up journalism in 1852, after ten years in gov. service, and ed. numerous Pan-slavist journals, including the *Den*, 1861–65; the *Moskva*, 1867–68; the *Mosvich*, and the *Russ*.

Akyab, a dist., area 5136 sq. m. and tn. in the Arakan div. of Burma. After the cession of Arakan in 1826 A. was made the seat of gov., and rapidly grew from a small fishing village into a leading port, chief export rice, several large rice mills. Pop., dist. 576,340; tn. 36,569.

Alabama, the 'Cotton State,' one of the Gulf States of the U.S.A., bounded on the N. by Tennessee, on the E. by Georgia, on the S. by Florida and the Gulf of Mexico, on the W. by Mississippi, and having a gross area of 51,998 sq. m. In the extreme N. of the state is part of the fertile valley of the Tennessee: to the S. of this lies a hilly region containing parts of the Alleghany and Cumberland ranges, in which coal and iron are found. The centre of the state is occupied by the Cane-brake or Black Belt, one of the most fertile cotton countries in the world. To the extreme S. is a low-lying, sparsely populated dist., very heavily wooded. The country is well watered, and the A. and Tombigbee are navigable rivs. The leading industry of the state is still agriculture. A. ranks as one of the leading cotton-producing dists., and Indian corn, tobacco, rice, and wheat are largely grown. The coal, iron, and steel industries in the N. are increasing rapidly, and cotton-manuf. and the lumber trade show considerable growth. The climate is warm and equable and very healthy except in the low-lying land in river-valleys.

A. takes its name from an Indian tribe, which formerly inhabited this region. The territory now constituting A. was first explored in 1540 by the Spaniard, De Soto, who passed through it from *Florida* to the Mississippi. The first permanent settlement was made by the Fr. on Mobile Bay in 1702, and was removed to the present site of Mobile in 1711. Towards the close of the seventeenth century [illegible] to this region, [illegible] liscoveries of [illegible] ho descended [illegible] Arkansas in [illegible] who sailed [illegible] its mouth in [illegible] claimed the [illegible] Mexico, and [illegible] ig A. was included wholly or in part by the Carolina Charters of 1663 and 1665, and by the Georgia Charter, 1732. In 1763 the Fr., by the *Peace of Paris*, ceded A. to Great Britain; Florida, then a part of A., being also transferred to Great Britain by Spain. The treaties of Versailles and Paris led to complications over A., between U.S.A., Spain, and England, but at the close of the eighteenth century all the present area of A., except that portion lying S. of the thirty-first parallel, was ceded by Great Britain to the U.S.A. The Floridas were transferred by Great Britain to Spain at the same time. In 1795 Spain relinquished her claims to the territory N. of the thirty-first parallel. In 1819, after Spain had virtually given up all claims to any territory in A., A. became a state with boundaries as at present, and was admitted to the Union.

Disaster befell A. in 1837 as a result of the corruption of the note-issuing state banks, and the state's public debt reached over 3¼ million dollars. Further trouble occurred over the slave-holding question, the 'Alabama Platform' definitely pronouncing against any infringement of slave-holding rights. A., in 1860, together with other cotton states, seceded from the Democratic National Convention, and as a Confederate state sent out the bulk of its male white population to fight against the N.

After the war the negro population gained the ascendency and disfranchised the white voters, but financial disaster quickly followed, the state debt reaching 26 million dollars in 1874. In 1901 a new constitution greatly curtailing the negro voting power was adopted. A. has thirty-seven railways, eight of them trunk lines. More than a third of the land-owners are coloured, there are strict laws against the marriage of whites and negroes. Pop. estimated 2,646,248, of which 60 per cent. were white. The state cap. is Montgomery; the seaport is Mobile. Principal towns, Birmingham, Anniston, Selma, Bessemer.

Alabama, The, a Confederate cruiser in the American Civil War which, causing immense loss to the commerce of the Federal States, gave rise to the celebrated *Alabama Question*, and led to strained relationship between the govs. of the United States and Great Britain. England accorded to the Confederates the status of 'Belligerents,' and was lax in the enforcement of strict neutrality. This very nearly precipitated a war between the two countries, which was only averted by arbitration. The *A.* was built in the yard of Messrs. Laird and Sons, Birkenhead, and the vessel, before coming out in its true light by being named after one of the seceding states, was known as 'No. 290,' *i.e.* her number in the builders' yard. Built of wood, with barquentine rig, she was equipped with screw propellers of the then considerable speed of 11 knots an hour under steam. It was not until she was nearly completed that the Federal agents suspected her mission, and called upon the British gov. to detain her. The crown law officers advised detention with a view to submission of the question to a court of law. Being apprised of the gov.'s intention, the still incomplete *A.*, on the pretext of making a trial trip, steamed down the Mersey and out to sea on July 29, 1862. She made for the Azores, where, under the direction of her commander, Captain Semmes, she was equipped with arms and ammunition. Thus armed she sallied forth on Aug. 24. She made her first capture in the same neighbourhood on Sept. 5, and by the 14th of the same month had captured and sunk ten vessels. Owing to all the Confederate ports being blockaded, Semmes was compelled to sink his prizes. Other captures were made between Newfoundland and the West Indies, near Cape St. Roque, in the Straits of Sunda, and elsewhere. In all she captured some sixty-eight vessels and inflicted direct damage to the extent of nearly £1,000,000. Indirectly the damage done to commerce was enormous, and the menace of capture by the *A.* sufficed to transfer in one year to the British flag vessels whose aggregate tonnage exceeded a quarter of a million. The *A.* did not confine her energies to commerce-destroying, but early in her career, off Galveston, then blockaded by the Federals, engaged and sunk the gunboat *Hatteras.* Finally, on June 19, 1864, the Federal warship *Kearsarge*, commanded by Capt. Winslow, caught the *A.* off Cherbourg, and after an hour's engagement, in which the latter vessel was reduced to a sinking condition, Capt. Semmes surrendered. The prolonged negotiations between this country and the U.S.A. eventuated in the Treaty of Washington, 1871, by which it was agreed to refer the dispute to a court of five arbitrators, one each to be nominated by England, U.S.A., Italy, Switzerland, and Brazil. This court sat at Geneva in Dec. 1871, and awarded the U.S.A. £3,229,166, in respect of damage done by the *A.* and two other vessels, the *Florida* and the *Shenandoah.* The question is discussed in most works on International Law. *See* J. W. Dwinelle, *American Opinions*, 1870; M. Bernard, *Neutrality*, 1870; G. W. Lowrey, *English Neutrality*, 1863.

Alabama River, 315 m. long, rises in the state of Georgia. It flows through Montgomery, the cap. of the state, and unites with the Tombigbee to form the Mobile, a short riv. which flows into Mobile Bay, on which is situated the tn. of Mobile. It drains the greater part of the state of A.

Alabaster, a term applied to two different minerals. The A. of the ancients is said to have derived its name from the tn. of Alabastron in Egypt. It is a hard marble-like carbonate of lime formed by a stalagmitic process, and was in much demand for ornamental purposes. The 'alabaster box of very precious ointment,' mentioned in Matthew xxvi. 7, was made of this substance.

The A. of the present day is gypsum (*q.v.*), a hydrated sulphate of lime. It is a much softer mineral than the anct. A. and slightly soluble in water, but it is used for making ornaments, statuettes, etc.

Alagoas: 1. A state of Brazil, bounded on N. and N.W. by Pernambuco, of which it was originally part, on S.W. by Sergipe, and on the S.E. by the Atlantic. It has an area of 22,580 sq. m., and a pop. of about 980,000. The soil is fertile, and the country well watered, but agriculture is only sparingly carried on owing to the deadly climate. The chief pro-

ducts are sugar, tobacco, coffee, and cotton. Maceio is the cap. 2. Tn. in state of same name, near the coast, on Lake Manguaba. Formerly the cap. of the prov. Pop. 15,326.

Alais, tn. in dept. of Gard, France, on R. Gardon, 25 m. N.W. of Nimes. It is situated on a productive coal-field, and has manufs. of silk, glass, and iron. A. sided with the Huguenots in the seventeenth-century religious wars, and was taken in 1629 by Louis XIII. and Cardinal Richelieu. A treaty signed here in the same year ended the war. Pop. 36,455.

Alajuela, cap. of prov. of same name, Costa Rica, 12 m. N. of San José. The centre of an important coffee and sugar dist., and the headquarters of many revolutionary outbreaks. Pop. 13,737.

Alaman, Lucas (1775–1855), Mexican statesman and author. Represented Mexico in Spanish Cortes till 1823, when he returned to Mexico and became Secretary of the Interior, and in 1853 Minister of Foreign Affairs. His policy was reactionary and despotic. Wrote *Disertaciones sobre la Historia Mejicana*, 1844–49, and *Historia de Mejico*, 1849–52.

Alameda, a residential city in Alameda co., California, 6 m. from San Francisco. Pop. 34,392.

Alamo, the 'Thermopylæ of America,' originally a Franciscan mission, but used at the end of the eighteenth century as a fort. In the Texan War of Independence (1836) a party of Texans and Americans numbering 180 held it against a large number of Mexicans under General Santa Anna. Continued assaults were re-pulsed from Feb. 23 to March 6, when the Mexicans, having lost over 00 men, reduced the garrison to five. These were captured and put to death y order of Santa Anna.

Alamos, tn. in state of Sonora, exico, 125 m. N.W. of Sinaloa. The . is in the centre of an important ver-mining dist. Pop. 10,000.

Aland, the chief is. in an archi-lago of the same name, at the trance to the Gulf of Bothnia, form- part of Finland. Taken from eden by Russia in 1809, and occu-d by the allies in 1854. They e used in the Great War by the mans as a naval base but, in 1919, tralised and the forts rased. A iscite taken in the same year favourable to self-government, the islands now form part of the ublic of Finland. Pop. 27,000.

ani, the collective name of dif-t nomadic tribes who dwelt N. e Euxine and the Caspian. It ally belonged to a Caucasian which was frequently at war the Rom. provs. Ultimately many of them allied themselves wit the Huns and Vandals. Many o these settled in Portugal and Afric about the fifth century.

Alarcon, Hernando de, a Spanish navigator in the sixteenth century. In 1540 he sailed from Acapulco to support the expedition under Vasquez Coronado in search of the seven cities of Cibola (Mexico). By exploring the Gulf of California he proved that California was not an island. He also ascended the Colorado R. A report of the expedition occurs in Hakluyt's *Voyages*, and the earliest known map of the region was made by Castillo, one of his pilots. See *Histories of the Discovery of America*.

Alarcon, Pedro Antonio (1833–91), a Spanish novelist and statesman, *b.* at Guadix, *d.* at Madrid. He was intended for the Church, but soon took up journalism, writing for the *Eco del Occidente* of Cadiz, and after the revolution of 1854 editing *El Látigo.* He accompanied the Morocco campaign of 1859 as a correspondent, publishing an excellent diary of his experiences in 1860. In 1864 he entered the Cortes as Liberal member for Cadiz, and later filled many important posts, including deputy member of council of state and ambassador. His short stories, poems, and essays were collected under various titles in 1871, 1875, and 1883. His later novels, many on religious subjects, were not so popular as his sketches and studies of rustic Spain. Among his works are: *Poesias seriosas y humoristicas*, 1870; *Cosas que fueron*, 1871; *Diario de un Testigo de la Guerra de Africa*, 1860.

Alarcon y Mendoza (1588–1639), a Sp. dramatic poet, *b.* in Tasco, Mexico, *d.* in Cordova, Spain. He graduated in Mexico in 1606, and in 1622 went to Spain to fill a position under the council of the Indes. In 1628 his first vol. of eight dramas was pub. at Madrid. The second vol. of twelve plays appeared at Barcelona in 1635. His work includes heroic drama, character-plays, and comedies of intrigue, and ranks very high in Sp. literature. His best known play is *La Verdad Sospechosa* (imitated by Corneille in *Le Menteur*). Others are *Las Paredes Oyen*, *El Tejedor de Segovia*, and *Todo es Ventura*. He received little contemporary appreciation, and treated his rivals and the public with great scorn. His work has been much plagiarised.

Alaric I., a great Visigothic chief of the fourth century. In 394 he commanded the Gothic allies of Theodosius against Eugenius. At the death of Theodosius in 395 he left the Rom. service, having become King of the West Goths, and invaded Greece in 396. In 397 Stilicho drove him

back to Epirus. In the same year Arcadius made him governor of Illyricum. In 400 he invaded Italy, but was defeated by Stilicho at Pollentia and Verona in 402. He then made a treaty with Honorius, but this having been broken, besieged Rome, and captured and sacked it in 410. He died in that year at Cosentia.

Alaric II., King of the Visigoths, 484–507. He succeeded Euric to an extensive kingdom, and during most of his reign was at peace with the Franks. He was a wise and tolerant ruler, and ordered the compilation of the *Breviarium Alaricianum*, a selection from Rom. legal writers, for the use of his governors. His prosperity ultimately brought him into conflict with the Frankish king Clovis, who, on a religious pretence, made war upon A., whom he defeated and killed at Poitiers. *See* GOTHS AND VISIGOTHS.

Alarm, originally a call to arms or some device for that purpose, such as an alarm-bell. Now the term is applied principally to a clock sounding at a fixed time to awake sleepers. It is also applied to any device intended to give warning of the approach of burglars, fire, etc.

Alarodian languages, the name applied by many philologists to the Caucasian group of languages, of which Georgian is the chief. The term is derived from the Alarodii of the classical geographers. *See* De Brosset's *Elements de la langue georgienne*, 1837, and Sayce's *Introduction to the Science of Languages*, 1880.

Ala-Shan, a prov. of S. Mongolia, occupying the S. part of the Gobi Desert. It is about 800 m. long and 480 m. wide, and is very sparsely inhabited by Olüts, the pop. being about 20,000. The dist. is an arid sandy plain, with occasional low hills and chalk downs. A little grazing is done where the absence of saline deposits permits. To the E. is the Ala-Shan, or Khara-Narim range, reaching 11,000 ft. The prov. was annexed by China in 1636.

Alashehr, a tn. of Asiatic Turkey, on the slope of Mt. Tmolus, 75 m. E. of Smyrna. It is the seat of a Gk. archbishopric, and has a considerable trade. It contains numerous remains of sculpture, and is supposed to be the scriptural Philadelphia. Pop. 15,000.

Alaska, Territory of U.S.A., occupies the extreme N.W. corner of N. America, with the adjacent islands, being bounded on the N. by the Arctic Ocean, on the E. by the Yukon dist. of Canada and British Columbia, on the S. by the Pacific Ocean, and on the W. by Behring Sea and Straits. It was formerly known as Russian America. It has an area of 590,884 sq. m., and a population of 59,278, of whom nearly 28,000 are whites and the remainder chiefly Indians, with a few hundred Japanese, Negroes, and Chinese. There is a floating population of 20,000 (excluded from the above) employed in the mines, on the railways, and in the canning industry. The country may be divided into four dists. The Pacific Mt. belt, along the S. coast, contains four ranges, the Coast, the St. Elias, the Eleutian, and the Alaska, apparently a continuation of the Coast Range of W. America. Sev. lofty peaks are found here, including Mt. Sanford, 16,200; Mt. St. Elias, 18,026; Mt. McKinley, 20,300; and Mt. Foraker, 17,000. This dist. comprises the basins of the Copper and Sushitna Rs. The coast is deeply indented and precipitous, and bordered by numerous islands. The Central Plateau, at an average elevation of 3000 to 5000 ft., is a rolling upland with deep channels trenched by rivs., the chief of which are the Yukon and the Kuskoquim. The Rocky Mt. system, which enters A. as a wide belt comprising sev. ranges, with peaks of 7000 and 8000 ft., merges into the Endicott Range, and dies away towards the Arctic Ocean. The Arctic slope, divided into the Anuktuvuk Plateau and the featureless coastal plain, is as yet very little known. The rivs. of A. are large, numerous, and navigable. The great system of the Yukon falls into the Behring Sea. The northern rivs. are comparatively unimportant. The chief industries of A. in the past have been fish and fur. The salmon fisheries are very fine. Whaling has lately fallen off considerably. The fur trade, comprising seal, sea-otter, and sev. varieties of fox, is also on the decrease. Reindeer have been brought in from Siberia, and there are now upwards of 400,000 head in the country, yielding an increasing tonnage of reindeer meat for export. The number of foxes is also increasing, and the value of fur-bearing animals exported reaches £475,000 a year. Salmon-fishing is an important activity and there are adequate stringent laws for the protection of the fisheries, on which some 30,000 persons are employed, the majority being engaged in salmon canning. There are also valuable fur-seal herds on the Pribilov Is., the estimated number of animals being close on 800,000. Agriculture suffers from the shortness of the summer, but the soil appears to be rich, and recent experiments go to show that numerous hardy vegetables and sev. cereals may be grown in many parts of the country, while the abundance of

grazing grasses offers possibilities of pastoral development. The timber resources are still untouched. The mineral wealth of A. has only lately been exploited. Gold was first found in 1861, and prospecting has gone on ever since, though as yet no veins of the richness of the Klondyke deposits have been found. Gold is worked chiefly in South-East A., where a low-grade ore is found; on the Yukon R.; and on the W. coast, the annual yield being valued at £1,300,000. Copper, silver, coal, lignite, gypsum, and marble are also mined. The range of climate is considerable. It has short, very hot summers and long, severe winters. The pop. of A. is approx. 55,000, having declined by about 10,000 from its highest figure, which was in 1910. The whites number nearly 30,000. Indians and Eskimos, 25,000, the others being mainly Mongolians. There is also a 'floating' pop. of some 20,000 persons who visit the country annually seeking employment in fishing and mining. The seat of government is at Juneau (1644); other important tns. are Ketchikan, 2400; Anchorage, 1800; Sitka, 1200; Fairbanks, 1100; and Nome, 1100. There are some eighteen incorporated tns.; most of them are equipped with all modern advantages, such as electric lighting, and, in some cases, an up-to-date means of water supply. A. was discovered by Vitus Behring (*q.v.*) in 1741. In 1867 it was purchased from Russia by the U.S. In 1906 A. received power to elect a delegate to the U.S. Congress. In 1912 a law was passed by the Congress conferring legislative power on A. and constituting Juneau the capital of the territory; it also created a Railroad Commission. The rail route from Seward to Fairbanks, projected in 1915, is now open, and the system comprises altogether 500 miles of track and connects the terminus with the coalfields at Malanuska. There are four National and over a dozen Territorial banks, with total deposits of some $7,000,000. The Gov. of A. is charged with the education of the whites, while educa-ion for the native elements is in the ands of the Alaskan division of the National Bureau of Education. There s also an Agricultural College and chool of Mines at Fairbanks.

Boundary Commission, 1903.—The spute between the U.S.A. and anada began with a treaty between ussia and Great Britain in 1825, ich laid down a boundary line for at part of the deeply indented coast ich runs up from the Portland Canal Mt. St. Elias, embracing a narrow p of coastline and the Alexander chipelago; this line, which was to follow 'the tops of the mounta parallel to the coast, to meridian 14 limited the strip to ten marine leagu from the coast, following the windin of the coastline. In 1867 the U.S. purchased the Russian-Alaskan Com pany's territory, and then followed period of disputes between Canad the U.S.A., and Great Britain on th question whether the internationa line was to go across or round th indentations of the coast. An at tempt to settle this dispute by a joint high commission in 1897 broke down, but in 1903 it was agreed to decide the question by a commission of six 'impartial jurists' from Canada, U.S.A., and Great Britain. The commissioners were Lord Alverstone, Lord Chief Justice of England, Sir L. Jette, Mr. A. B. Aylesworth, of Canada, lawyers of repute; and Senator H. C. Lodge, Hon. Elihu Root, and Senator G. Turner, of the U.S.A. The decision, not signed by the Canadian representatives, favoured the American contentions, giving Canada no access to the inlets down to the Portland Canal, and only two of the islands claimed. Much feeling was aroused against Lord Alverstone's vote in Canada as being dictated by British policy in regard to the U.S.A., but the award has since come to be looked upon in Canada as a good workable compromise. *See* a series of articles from 1908–9 in *The University Magazine* of Montreal.

Alassio, a fishing-town of Liguria, prov. of Genoa, Italy. Pop. 5130.

Alauda (Lat., lark), belongs to the family Alaudidæ of the Passeriformes, is a granivorous bird. The wings are broad and long, the tail is short, the head-feathers may form a crest. *A. arvensis* is the skylark, *A. arborea* the wood-lark.

Alausi, tn. on Alausi R., prov. of Chimborazo, Ecuador, 70 m. E. of Guyaquil. It is situated on a plateau of the Andes. Pop. 6000.

Alava, the largest and most southerly of the three Basque provs. of Spain, having an area of 1205 sq. m. and a pop. of about 98,000. The cap. is Vitoria. Contains valley of Ebro, and much of the Cantabrian Range.

Alava, Don Miguel Ricardo de (1771–1843), Spanish statesman and general, *b.* at Vitoria, Spain, *d.* at Barèges, France. Left the Sp. service for that of Joseph Bonaparte, 1808; joined Wellington's army, 1811. Became Sp. ambas. to The Hague, 1815; Liberal leader in Cortes, 1820; exiled, 1823; recalled, 1833; ambas. to England, 1834; to France, 1835.

Alavoine, Jean Antoine (1776–1834), Fr. architect. He worked on many

churches and public buildings in Paris. He is best known for his 'Fontaine d'Eléphant' on the Place de la Bastille.

Alb, a liturgical vestment of the Catholic Church, consisting of a white linen tunic with narrow sleeves and a hole for the head, and ultimately derived from the 'tunica alba' of Rom. citizens. Originally plain, in the tenth century embroidered bands were employed for borders and cuffs, and later 'apparels,' *i.e.* square patches of ornamentation, four or five in number, were used. As. have reappeared in the Anglican Church with the ritual revival.

Alba, tn. in Cuneo, Piedmont, Italy, on R. Tanaro, 31 m. S.E. of Turin. It is the anct. Alba Pompeia, and contains numerous remains of anct. It. life, together with a fifteenth-century Gothic cathedral. Pop. about 9000; commune 14,500.

Alba, Duke of, *see* ALVA.

Albacete, cap. tn. of prov. of same name, Murcia, Spain, 138 m. S.E. of Madrid. Pop. 31,960. Has a considerable trade in cutlery and an annual cattle-fair. The prov. has an area of 5972 sq. m. and a pop. of about 291,933. The W. part is mountainous; the rest a tableland.

Alba Longa, an anct. tn. of Latium, Italy, on a ridge overlooking the Alban Lake, 15 m. S.E. of Rome. Said to have been founded by Ascanius, son of Æneas. Sev. generations of kings lived here, and it was the bp. of Romulus and Remus and the centre of the Latin League. Destroyed by Tullus Hostilius, third king of Rome, and never rebuilt.

Alban, St., the protomartyr of Britain, *b.* at Verulam (now St. Albans) in the third century, and converted to Christianity late in life. He suffered martyrdom by the sword about 304. King Offa founded the famous monastery of St. Albans on the site of his birth or death in 795. The Roman Church keeps his festival on June 22, and the Anglican on June 17.

Albani, a rich and famous Rom. family, coming originally from Albania and settling at Urbino in the sixteenth century. The fame of the house began with the accession of Giovanni Francesco A. to the papal throne in 1700, since when numerous members have been cardinals and other high church officials. Cardinal Alessandro A. (1692–1779) formed the celebrated art collection at the Villa A. at Rome, which was depleted by the Fr. The family died out in the nineteenth century.

Albani, Francesco (1578–1660), It. painter of the Carracci school, *b.* at Bologna, and *d.* there. He painted numerous altar-pieces, but preferred mythological or pastoral subjects. His twelve beautiful children served as models for many of his most famous paintings, now at Rome, Dresden, and in the Louvre. Opened a Rom. academy.

Albani, Dame, stage name of Marie Louise Emma Cecile Lajeunesse, a Canadian singer, *b.* at Chambly, Quebec, 1851. Trained in music by her father, she first appeared in public at Albany, N.Y., in 1863. After studying in Paris and Milan, she made her *début* at Messina in 1870 as 'Amina' in *La Sonnambula*. In 1872 she appeared in London with the Royal Italian Opera, later visiting Paris (1872), U.S.A. (1874), St. Petersburg (1878), Berlin (1884), etc. In 1878 she married Ernest Gye, a theatrical manager. She later left opera for oratorio, and sang at all the chief festivals and before many European monarchs.

On the eve of her retirement in 1911 she published her reminiscences, *Forty Years of Song*, and at her farewell concert at the Albert Hall received a purse of gold. In 1925 a grand concert was organised on her behalf and she was given a Civil List pension, and, in the same year, created a Dame of the Order of the British Empire. In her forty years' career she appeared in every rôle it is possible for a singer to fill: oratorio singer, operatic artist and, later, ballad singer. Brilliance and sympathy of voice, aided by completeness of perception and charm of manner, helped her to find a leading place in the esteem of the whole musical world. Her success was immediate on her performance in *La Sonnambula*, and soon she was building up a reputation as one of the leading sopranos of the day. Sir Arthur Sullivan's setting of the *Golden Legend* was inspired by her voice and Gounod composed his *Mors et Vita* as an especial tribute to her.

Albani, Matthias, the name of two celebrated Tyrolese violin-makers. The father (1621–73) was *b.* at Bozen and was taught by Stainer. The son studied the art of violin manuf. at Cremona and afterwards settled at Rome. The instruments he made between 1702 and 1709 are especially fine and considered by some the equal of Amati's.

Albania, a democratic monarchy which, prior to 1912, formed a part of the Turkish Empire, consisting of a very mountainous strip of land lying on the W. shore of Balkan Peninsula, between Montenegro and the N. boundary of Greece. It is little explored and, probably owing to its

rugged features and unsafe roads, remains unattractive to the traveller. The mts. of Northern A. form the watershed between the Ægean and the Adriatic Seas; they consist of a high mass of rocky mts. which spread through Montenegro to the Adriatic. The Highlands of A. may be described as lying in the N. and S., the mts. of Central A. being of a more undulating character. Owing to the character of the mts., the rivs. which flow from E. to W. are not navigable. The chief rivs. are the Boyana and the Drin. The mineral wealth of A. is probably great, but the country is almost entirely unexploited. It has splendid forests, and produces wine and olive oil. The chief means of subsistence are cattle-rearing in the plains, sheep- and goat-rearing in the mts. The pop. of A. is roughly estimated at about 1,600,000. The chief tns. are Scutari, Prizrend, and Yanina. As a race the Albanians are one of the most anct. in the Balkan Peninsula; they are noted for their sturdy independence and for the tenacity with which they have clung to their customs and traditions. The majority of the Albanians are Moslems, the remaining portion of the pop., roughly two-fifths, belong either to the Greek or Roman Catholic Churches. A number of interesting Rom. remains prove the existence of a Rom. influence in A. Two ports, the present Pollina (Rom. Apollonia) and Durazzo (Rom. Dyrrachium), on the Adriatic, must have been thriving tns. during the days of Rom. authority, but have now fallen into disuse. The mediæval history of A. is as interesting as it is varied. During the fourth and fifth centuries it was in the hands of the Goths, in the sixth century it again became part of the Eastern Empire under Justinian, and in the following century came under the sway of the Serbians, who held it, with a short break, until the four-eenth century. In the twelfth cen-ury for a short period the Normans, nder Robert Guiscard, tried to form kingdom there, and Michael Com-enus, after the setting up of the atin Empire, retired thither and ed to build up an independent ngdom. During the later portion the thirteenth and the beginning of fourteenth centuries, the Angevin gs of Sicily ruled also the kingdom A. The Serbians, however, re-ablished their power in the twelfth ury and retained it until the h of Dushan in 1360. Between downfall of Serbian rule and the blishment of Turkish power, A. ruled by native chieftains. Dur-he fifteenth and sixteenth cen-s, however, in spite of brave and

prolonged resistance, A. gradua fell into the hands of the Tur In the eighteenth and early nin teenth centuries attempts were ma by individual Moslem chieftains establish their independence in A bania, but with the fall of Ali Pasha i 1822 these attempts practically cam to an end. At the conclusion of th Balkan War (*q.v.*) the Treaty o London settled the independence o A. (May 1913): a ruler was to be chosen by the Powers, and in Nov. 1913, Prince William of Wied (*q.v.*) was invited to take up that office. On Feb. 19, 1914, he notified the Powers of his acceptance, and before entering upon his duties paid visits to the principal courts of Europe; these visits were not unconnected with the floating of a loan of £3,000,000 which was required to set up government in A. On Feb. 21, 1914, Prince William received at Neuwied an Albanian deputation, consisting of Essad Pasha (*q.v.*) and a number of Albanian chieftains, who offered him the crown on behalf of the Albanian people, which he accepted. His position was beset with many difficulties, not least among which was the question of Northern Epirus—'the Ulster of A.'—where a revolt took place on his arrival in A. He was known in A. by the title of 'Impret' (said to be a modification of 'Imperator'). It was evident, on the outbreak of the Great War, that there was no stability in this arrangement of a petty principality created by the influence of Germany with the object of furthering Austro-Hungarian policy in the Balkans. In December 1914, Italy despatched an expedition to Avlona on the Albanian coast as a set-off to Austrian aggrandisement in Serbia. The Entente in 1915 promised A. to Italy as part of the price of It. support in the War. Unaware of this, the Dual Monarchy tried to secure It. neutrality, offered Italy sovereignty over Avlona and a free hand in A. Later in 1915, however, after the Montenegrin capital had fallen, the Austrians, under General von Koevess, marched southward into A., captured Scutari and reached the heights of Tirana (Jan. 1916). Meanwhile Bulgarian troops had also crossed the frontier and occupied El Bassan. This double invasion overwhelmed Essad Pasha, the pro-Ally head of the provisional Albanian Government with the result that the Italians evacuated Durazzo, but continued to hold Avlona and so dominated Southern A. Strategically, however, the advantage lay with the Central Empires, who had now safeguarded the then new Ger. railroad connection

with Constantinople. After the Armistice, the settlement contemplated the transfer of Southern A. to Greece, Italy being acquiescent provided Greece recognised an It. protectorate over the greater part of the country subject to a small northerly strip being ceded to Serbia. Finally, however, at the Conference in San Remo, 1920, A. was only mandated to Italy. Later, a republic was proclaimed with a constitution providing for a Parliament of fifty-four elected members and a senate of eighteen, under a President (Ahmed Zogu, 1925). In 1927 Italy signed with A., a treaty of friendship and arbitration. In 1928 the Constituent Assembly proclaimed A. a democratic monarchy, Ahmed Zogu assuming the title of Zog I, King of the Albanians. *See* BALKAN WAR, SCUTARI, and SERBIA.

Albano, the name of a tn., lake, and mt. of Italy. The tn. lies 12 m. S.E. of Rome on the Via Appia, and is celebrated for the beauty of its scenery. The lake and mt. lie 13 m. S.E. of Rome. The lake is 6 m. in circumference, and the mt. rises a little over 2000 ft. above the lake.

Albans, St., *see* ST. ALBANS.

Albany, a Canadian riv. It rises in Lake St. Joseph and flows into James Bay. Its total length is 500 m. It is navigable up to Martin's Falls. Fort A. stands at its mouth.

Albany: 1. The co. tn. of A. co. and cap. of the state of New York, U.S.A.; situated on the W. bank of the Hudson R. The first settlement was made here in 1614 by the Dutch, who called the place Fort Nassau. In 1664 it was occupied and named by the Eng. In 1754 there was held here the General Conference of the states, in which plans for a closer union were mooted. It played an important part in the American War of Independence, and became the state cap. in 1797. It has a number of magnificent public buildings, amongst which may be mentioned the State Capitol (1879), the costliest in the United States, the City Hall, the Federal Building, and the State Museum of Natural History. The Capitol was partially destroyed by fire in March 1911, and many valuable documents were destroyed. It is an important railway and commercial centre. It has breweries, stone factories, cotton mills, clothing factories, and iron and brass foundries. Pop. 127,358. 2. The co. tn. of Dougherty co., Georgia, U.S.A., at the mouth of the Kinchafoona Creek, on the Flint R. Settled in 1836, and became a city, 1907. Pop. 14,507. 3. The co. seat of Linn co., Oregon, on the Willamette R. Manufs. wagons and furniture, and exports flour and grain. Pop. 4840. 4. The co. seat of Gentry co., Missouri; residential tn. and seat of Central Christian College (opened 1892). Pop. 3000.

Albany, situated in the co. of Plantagenet, W. Australia, on the Princess Royal Harbour, 254 m. S.S.E. of Perth. Pop. (1929) 3980. Possesses the finest harbour in W. Australia. First settled as a penal colony in 1826, it became a municipal tn. in 1871.

Albany, Count, the assumed name of the two brothers John Sobieski Stolberg Stuart (1797–1872) and Charles Edward Stuart (1799–1880), who claimed to be descendants of the Young Pretender. Both served on the Continent under Napoleon till his final defeat, and then settled successively in London, the Highlands, and Austria.

Albany, Dukes of, title created first in 1398 and bestowed on Robert Stewart, Earl of Fife. The title has been revived at various periods in British history, being conferred on Darnley by Mary Queen of Scots in 1565, held by James I., Charles I., and James II., again bestowed on the youngest brother of George I., on the younger brother of George III., and on the second son of George III. It was finally revived in 1881 by Queen Victoria for Prince Leopold (*q.v.*).

Albany, Leopold George Duncan Albert, Duke of (1853–84), the youngest son of Queen Victoria. He was known as Prince Leopold until created Duke of A. in 1881, and he married Princess Hélène of Waldeck-Pyrmont, 1882. He was a liberal patron of literature and education. Always delicate, he *d.* at Cannes at thirty-one after a very short illness.

***Albany, Louise Maximilienne Caroline*, Countess of** (1752–1824), the eldest daughter of Prince Gustavus Adolphus of Stolberg. Married to the Young Pretender in the days of his decline, her marriage proved most unhappy. In 1780 she fled from her husband and threw herself on the protection of Henry Stuart, her brother-in-law. Here she lived quietly and happily, interesting herself in literature. In 1788 she was released by the death of Charles Stuart, and is said to have married the poet Alfieri. She visited England and the Eng. court, and was well received.

Albategnius (or Al-Battani), properly Mohammed ben Gebir ben Sinan al Battani, his surname being taken from his native tn. Battan in Mesopotamia (*c.* 850–929), an Arab chief and astronomer who, while following in general the Ptolemaic system, made sev. improvements thereon. His astronomical treatises were trans. into Lat. by Plato Tibur-

tinus early in the twelfth century, and printed [illegible] 37 and in 1645. [illegible] : *Abridgments of* [illegible] *edes with Comments; A Work on Astronomy,* [illegible] *atise* [illegible] *and* [illegible] *An Elementary Treatise on Astronomy and Astrology.*

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Albert, Margrave of Brandenburg (c. 1100–70). A., usually known as A. the Bear, was margrave of the N. Mark, situated between the N. courses of the Elbe and the Oder. Later he

acquired Brandenburg, the beginning of the modern kingdom of Prussia, and since that time Brandenburg has usually played an important part in Ger. affairs. Sometimes in rivalry, sometimes in harmony with Henry the Lion, he was an important factor in the civilisation of N.E. Germany. It is important to notice that the progress of Christianity in Germany coincided with the acquisition of ter.; that missionary and soldier worked side by side. A. the Bear may be said to be the forerunner of Prussian greatness.

Albert, Prince Consort (1819–61). Albert Francis Charles Augustus Emmanuel, the second son of Ernest, Duke of Saxe-Coburg-Gotha, was *b.* on Aug. 26. Educated under a private tutor, he showed great diligence and ability, and devoted himself to natural science. He also showed a great liking for painting and music. The idea of his marriage with his first cousin (Queen Victoria) was first mooted by Leopold I. of Belgium, and was opposed in England by William IV. Prince A. first visited England in 1836, and although no formal engagement was made, an understanding was reached by the two cousins. During the following years Prince A. completed his education, travelling in various parts of Europe, and in the latter part of 1839 a formal engagement with Queen Victoria was announced, which was followed by their marriage early in 1840 (Feb. 10). His position, however, was one of great difficulty and needed the utmost tact. He was made regent in 1840 in case of the queen's death; he helped the queen with advice in her political duties, and only after his death did the full value of the work he had done become apparent. His interest in the working classes and in the prosperity and well-being of Great Britain is now recognised by all. He was president of the Exhibition Commission, and it was due to his suggestion that the Great Exhibition was held in 1851. He almost alone realised that the manufs. of this country would be helped and not hindered by the holding of such an exhibition, and yet both in and out of parliament he was bitterly attacked. He was a man of matured ideas and was well fitted to ... on reforms in England, and he ... especially interested in the in... se of her prosperity. Taken ill ... the beginning of 1861, he was ... d with typhoid and died on ... 14.

...bert, Prince of Bayreuth (1522– ...), surnamed the Warlike, or ...iades was a son of Casimir of ...euth and a member of the Hohenzollern family. In 1541 he recei... Bayreuth as his family possessio... and is sometimes referred to as t... Margrave of Brandenburg-Kulmbac... after the name of the chief tn. ... his possessions. His restless yout... marked him out for a military lif... and he took part in many campaign... sometimes for, sometimes against th... Emperor Charles V. He was note... throughout Europe for his bravery and deeds of valour. His attacks on Franconia led to the formation of a league against him, and he was ultimately defeated. He was put under the ban of the empire and fled to France, where he took service under Henry II., dying shortly afterwards.

Albert, Prince of Mecklenburg (*d.* 1412), was called to the throne of Sweden in 1364 by the nobility who had deposed King Magnus. After a long war, peace was re-established in Sweden in 1395, when A. consented to give up his claims to the crown. He then retired into Mecklenburg, where he *d.* Margaret of Waldomar, widow of Haquin, King of Norway, succeeded him, and united the three N. kingdoms under one sceptre.

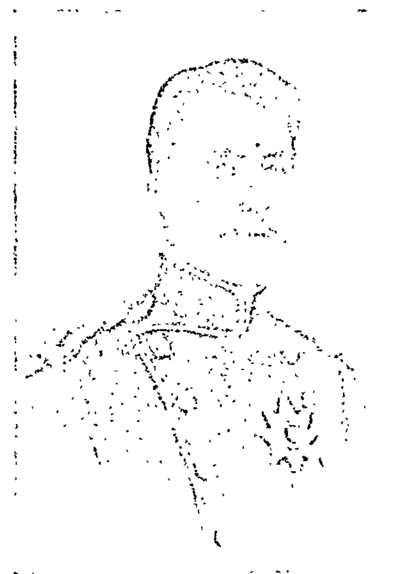
Albert I. (*c.* 1249–1308) was the son of Rudolf of Hapsburg, the founder of the great Hapsburg dynasty, and first emperor after the Interregnum. A. was not elected emperor on the death of his father, but was passed over by the electors, from motives of fear and jealousy, in favour of Adolf of Nassau. Adolf proved himself too weak to rule well, and was deposed and slain by the electors led by A. In 1298 A. was elected and crowned. During the ten years that he reigned he followed an energetic and ambitious policy which resulted in the reduction of Germany to obedience and the well-being of the Ger. people. He settled the succession question in Hungary and in Bohemia, settling the latter country upon his eldest son Rudolf, and thus making Austria the greatest power on the E. frontier of Germany. He was treacherously murdered by his nephew John.

Albert II. (1397–1439), King of Hungary and Bohemia, and Duke of Austria, succeeded Sigismund as Emperor of Germany in 1438. He held a great diet at Nuremberg, in which the 'Vehmic' or secret courts were suppressed. He *d.* the following year, as he was preparing to take the field against the Turks, who were ravaging Hungary.

Albert III. (1414–86), Elector of Brandenburg, surnamed Achilles, was *b.* in November. Quite early in his life he distinguished himself as a warrior. On the death of his father he received the territory of Ansbach and took his

place as one of the leading German princes. After a war against Nuremberg he was forced to recognise their independence. In 1470 he became elector of Brandenburg. In 1472 he finally brought Pomerania under his rule. In 1473 he handed over his possessions in Brandenburg to his son and retired to his Franconian possessions. He was one of the greatest and most ambitious of German princes.

Albert of Belgium, *b.* on April 8, 1875. He succeeded his uncle, Leopold II., on Dec. 17, 1909. In Oct. 1900 he married the Duchess Elizabeth of Bavaria, and has three



KING ALBERT I.

children. The eldest, the heir-apparent, was *b.* on Nov. 3, 1901, and is called Prince Leopold, Duke of Brabant; his second son, Charles Theodore, was *b.* in Oct. 1903, and his youngest child and only daughter, Marie José, was *b.* in Aug. 1906. The king is popular with his subjects and progressive in his policy. In the Great War he shared the hardships and vicissitudes of his armies during the Ger. invasion. To all the overtures of the Central Empires, whose Governments promised to restore to him his kingdom as the price of deserting the Entente, he turned a deaf ear. When, in October 1918, the Allies renewed their victorious advance on the Western front, his troops had swept, within a fortnight, from Dixmude to the suburbs of Ghent and on Nov. 13 he formally entered that city, Antwerp on the 19th and Brussels on the 22nd.

Albert the Bold (1443–1500), Duke of Saxony, surnamed the Bold or the Courageous. He was *b.* in January and spent the greater part of his early life at the court of the emperor. He attempted to obtain the crown of Bohemia in 1471 on the death of George. In 1464 he and his brother Ernest ruled jointly the possessions of their father, but in 1485, by the Treaty of Leipzig, a division was made, and Albert founded the Albertine branch of the Wettin family. He was a skilful soldier, and took part in a number of campaigns. He was made hereditary governor of Friesland in 1498 by the emperor, but while making good his title he died at Emden.

Albert Dürer, *see* DÜRER.

Albert Edward, *see* EDWARD VII.

Albert Edward Nyanza, *see* EDWARD NYANZA.

Albert Lea, city of Freeborn co., Minnesota, U.S.A., is the seat of the A. L. College for women. It is the centre and market for a flourishing agric. dist. Pop. (1910) 6192.

Albert Medal, an ornament given for gallantry in saving life, instituted by Queen Victoria in 1866, in commemoration of her late consort.

Albert Nyanza (native name, Mwutan Nzigo), a large lake of Central Africa, 100 m. long and 25 m. broad, situated in the lower basin of a great rift valley. It is intersected by 2° N. lat. and 31° E. long. Its position, but not its dimensions, was ascertained by Baker in 1864. The true, or White Nile, issues from the N. end of this lake, near the place where, on the E., the Victoria Nile enters, bringing the overflow of the Victoria Nyanza. It is connected with the Albert Edward Nyanza on the S. by the Semliki River.

Alberta, a prov. of W. Canada, estab. with its present boundaries by the Dominion Parliament in 1905. It covers an area of 255,285 sq. m., and has a pop. of 607,599 (1926). Its S. limit is the United States boundary; on the east 110° W. long. separates it from Saskatchewan; on the N. it is cut off from the N.W. Ter. by 60° N. lat.; while on the W. the Rocky Mts. separate it from British Columbia. Except in the S., where irrigation is necessary, the prov. is well watered. Its two great rivs., the Athabasca and the Peace R., flow N. and N.E. respectively until they meet the Slave R. coming from Lake Athabasca. The Slave R. then flows into the Great Slave Lake, whence, as the Mackenzie R., it drains into the Arctic Ocean. The Saskatchewan

(N. and S. branches), with its tribs., drains the S. of A. into Lake Winnipeg, and thence, under the name of the Nelson R., into Hudson's Bay. There are many small lakes, but Lake Athabasca and the Lesser Slave Lake are the two most important.

In the N. and S.E. the country is level and sparsely wooded, in the S. and S.W. near the Rocky Mts. it is broken, hilly, and more wooded. The centre is well watered and timbered, and is the chief agric. dept. Wheat, oats, and barley are especially cultivated here, and mixed farming is prosecuted with success. The chief industries, however, are ranching and farming, carried on particularly in the N. The sugar-beet is extensively cultivated and much fruit is grown. The climate is on the whole healthful and invigorating. Since the prov. extends over 11° of lat. it naturally varies considerably, and these variations are accentuated by the various levels of the land. In the N. the cold is severe, but is moderated by the *Chinook*, a wind blowing from the Rocky Mts. which melts the snow in a few hours. It is a moisture-bearing wind, and its influence is not entirely beneficial.

The prov. is rich in minerals. Great veins of both bituminous and anthracite coal have been found in A., and it is believed that over 25,000 sq. m. are underlaid with this mineral. Some 85 per cent. of the coal resources of Canada are in A., and 25 per cent. of those of all N. and S. America. Coal production in 1927 amounted to about 7,000,000 tons. Petroleum is found in the Turner Valley in S. Alberta and in other parts in commercial quantities. The sands of the N. Saskatchewan River have for years yielded some gold; there are large salt deposits in the N., and immense beds of tar sands in the district E. of Athabasca R. Annual mineral output is valued at over £6,400,000.

Two-thirds of the pop. are engaged in agriculture. It is estimated that there are about 85,000,000 ac. of agric. land in A., only about 10,000,000 of which are under cultivation. All the usual cereals are produced in large quantities, and alfalfa is also extensively cultivated. Important irrigation enterprises, which will water an area of over 1,000,000 ac., are operating at Calgary, Lethbridge, Bassano, and Medicine Hat. Mixed farming and dairying are features of the central section of the prov. The raising of horses, beef cattle, and hogs is also a feature.

Lumbering is a large industry in Northern A. Spruce, pine, poplar, birch, larch, and Douglas fir are the chief timbers. The great lakes of N. Alberta are stocked with fish, especially whitefish and pike. Trout and pickerel are also abundant. Fur trading is still an important industry, with Edmonton as the centre.

Secondary industries, which mainly supply local needs, comprise abattoirs and meat-packing plants at Calgary and Edmonton. Flour and saw-mills, brick-yards and tile-works, iron-works, harness factories, and stone quarries, are located at many points.

Railway development has been rapid since 1900. The lines of the Canadian Pacific Railway run from Medicine Hat and from the E. through the Crow's Nest and Kicking Horse passes over the Rockies. The mountains are also crossed by the Canadian National Railways via the Yellowhead Pass. The main line of the C.P.R. runs E. and W. through Calgary, and from there, are branches to Edmonton and Macleod, with offshoots starting at Larcombe and Wetaskiwin. Two through lines of the C.N.R. connect Edmonton with Winnipeg, Port Arthur and other centres in the E., and with Vancouver and Prince Rupert in the W. Canadian National lines also extend to Calgary from E. and N., and there are also extensions westward into the coal fields.

The government is vested in a Lieutenant-Governor, an Executive Council of eight members and a Legislative Assembly of sixty members elected for five years.

Cap. Edmonton; chief towns, Calgary, Lethbridge, Medicine Hat, Bassano, Strathcona, Red Deer.

Alberti, Leone Battista (1404–72), It. architect, sculptor, painter, musician, and man of letters, was *b.* at Venice. He was for some time pontifical secretary at Rome, where some monuments of his skill remain, but his best wo[illegible] be the church [illegible] Rimini. He also [illegible] of San Andrea, Mantua, and Santa Maria Novella in Florence. He was one of the earliest revivers of classic architecture. He wrote works on the theory of painting and statuary, but his great work is the *De re ædificatoria*, printed 1485. *See* Mancini, *Vita di Leo Battista Alberti*, Florence, 1882.

Albertine Line, the younger branch of the Saxon family of Wettin. It is descended from Albert, Duke of Saxony (1443–1500), who ruled jointly with his brother Ernest from 1464 to 1485, when they agreed upon a division of their lands. Since then his descendants have ruled what has been since 1806 the kingdom of Saxony, and held the throne of Poland, 1697–1763.

Albertinelli, Mariotto (1474–1515), *b.* at Florence, It. painter, was the pupil of Cosimo Roselli, and fellow-student with Fra Bartolommeo, with whom he collaborated in sev. works. Among his famous paintings may be named a 'Visitation' at the Uffizi in Florence, and a 'Virgin and Child' in the Louvre.

Albertite, a variety of asphaltic coal found in Albert co., New Brunswick. It is soft, and a shiny jet-black in colour.

Albertus Magnus (1193 *or perhaps* 1206–80), one of the greatest scholastic philosophers of the middle ages. He studied science at Padua, entered the Dominican order about 1222, and taught theology at Ratisbon, Strasbourg, Cologne, and Paris (1245). His works occupy twenty-one folios. St. Thomas Aquinas was his great pupil. His erudition was so extraordinary for the time as to comprise a very considerable knowledge of Arabian and Rabbinical literature. In natural science he followed Aristotle and Avicenna, agreeing with the latter over the impossibility of genuine metallic transmutation. *See* J. Sighart, *Albertus Magnus, Sein Leben und seine Wissenschaft*, Ratisbon, 1857.

Albertville, a tn. in the dept. of Savoie, France, near Chambéry. The tn. is divided by the riv., and has important manufs., especially pottery. Pop. 5654.

Alberus, Erasmus (1500–53), a Ger. reformer and man of letters, was *b.* at Sprendlingen near Frankfort-on-Main. He went to Wittenberg in order to study theology, and there met Luther, whose cause he soon espoused. His chief weapon in defence of Lutheranism was literary satire. He also wrote hymns, some of which are still to be found in the Ger. Protestant Hymnal, but his memory is preserved chiefly by his fables.

Albi (Lat. Albiga), Fr. tn., dept. of Tarn, possesses numerous interesting monuments of its varied history. It is the seat of an archbishopric, and manufs. linen goods. Trade is in wine and anise. The Albigenses took their name from this tn. Pop. 26,628.

Albicore is a corruption of *alba corella*, the name given by the elder Pliny to a species of tunny-fish. The name has been applied to various species of mackerel.

Albigenses, or Catharists, those holding a heresy which appeared in the S. of France in the early part of the eleventh century. Their creed, eastern in its origin, was allied to that of the Paulicians, a Gnostic sect holding Manichæan doctrines. It is difficult to discover exactly what their teaching was, since there are practically no texts of theirs extant. They preserved a continuous and determined opposition to Rome and all Catholic doctrines and practices. In this alone can they be considered as precursors of Protestantism. The A. were zealous, and their doctrines, supported by the nobility of S. France, spread rapidly. They were condemned at various councils, including the Lateran Council of 1179, but these condemnations only increased their opposition. Innocent III. resolved to extirpate the heresy, and in 1198 he sent two Cistercian monks, Regnier and Guy, to try pacific measures. These failing, he ordered a crusade to be preached against the A., which was led by Simon de Montfort, and continued until politically ended by the Treaty of Paris, 1229. The heretics were almost reduced, and the erection of an inquisition soon completed the work. The A. are not heard of after the early fourteenth century. *See* C. Schmidt, *Histoire de la secte des Cathares*, etc.

Albinatus Jus, *see* AUBAINE.

Albinism, that condition of the skin, hair, and eyes in which there is a congenital absence of pigment. An Albino is the name given to a person suffering from this defect. A. may be partial, when there are irregularly-shaped white patches on the skin or hair, or complete, when the entire surface is unpigmented, including the hair and the choroid coats and irises of the eyes. The irises appear pink because in the absence of pigment the transparency of the iris and retina allows the blood in the small veins of the eyeball to show through. This transparency of the iris constitutes a disability in sunlight, so that albinos usually pucker up their eyes and are often short-sighted or affected with nyctalopia; at night, however, their sight is better than normal, owing to the greater amount of light reaching the retina. A. occurs in all races of human beings, but particularly among negroes, whose race also shows a partial A. in which the black skin has white patches. It also occurs in nearly all classes of the animal kingdom, particularly among mammals. In some cases the A. is periodic and is restricted to the winter months, so that it enables animals in snow-covered countries either to approach their prey or to escape detection by their enemies; notable examples are the arctic fox and arctic hare. A. is partially hereditary, and occurs periodically in accordance with a regular system, which has been investigated by Mendel and others. The phenomenon also occurs among plants.

Albinus, Bernhard Siegfried (1697–

1770)—original family name Weiss (Ger., white), of which A. is the Latinised form— He taught both He was *b.* and Oder.

Albion, *anct.* name of Britain among Gks. and Roms. The name is perhaps of Celtic origin, but the Roms. took it as connected with *albus* (white), referring to Dover cliffs.

Albion: 1. A city of Calhoun co., Michigan, U.S.A., on the Kalamazoo R. A College of the Methodist Episcopal Church is situated here. It is the centre of a grain dist., with manufs. of agricultural implements. Pop. 6000. 2. The co. seat of Orleans co., New York, U.S.A., 30 m. from Rochester; exports apples, cabbages, and beans. Pop. 5600.

Albion, New, the name given by Sir Francis Drake to the dist. of Lower California, in N. America, which he visited in 1579. Later geographers, led by Humboldt, restricted the name to the dist. which Drake actually explored, between San Francisco Bay and the Columbia R. Name is no longer used.

Albion Metal, a compound formed from a sheet of tin laid on a sheet of lead, the two being combined by pressure between rollers.

Albistan, also called El Bostan, a tn. of Asiatic Turkey, near Marash. Pop. about 7000.

Albite, a silicate of soda and aluminium belonging to the felspar group. Its colour is pure white, hence its name (Lat. *albus*), and thus it can be distinguished from true felspar, with which it often occurs. It forms a constituent of granite and many crystalline rocks, either as primary or of secondary origin. Sev. varieties of A. are distinguished, e.g. *Pericline*.

Alboin, king of the Lombards, succeeded his father about the year 565 A.D. At this time the Lombards dwelt in Loncium and Pannonia. In conjunction with the Avars, A. overcame the Gepidæ, whose king he killed. Rosamund, the daughter of the dead king, he took for his wife. About 568 he invaded Italy, meeting with practically no resistance save at Pavia, which tn. held out for about three years. During the siege he overran a great deal of N. Italy, ruling over the whole of Venetia, Lombardy, Tuscany, and Piedmont. In 573 he was murdered by his wife's paramour, Longinus, who was instigated to the crime by Rosamund, whom the king had insulted by forcing her to drink from the cup formed of her dead father's head. A short play called *Rosamund*, by John Pollock, based on this story and in which Mme. Yavaska impersonated the title-rôle, was produced at the Kingsway Theatre, London, in 1911. See Paul Warnefrid's *Digestes Langobardorum*; Gibbon's *Roman Empire*, ch. xiv.

Albona, a city of Italy situated on the E. side of Istria, near Pola. In the vicinity are lignite mines. Pop. about 15,000.

Alboni, Marietta (1823–94), celebrated contralto opera-singer, was *b.* at Cesena, in the Romagna, and was trained first under Mme. Bertolotti at Bologna, and then under Rossini. Her f 3 at La Scala, brilliant succes and the U.S. She married first Count Pepoli (*d.* 1866), and secondly (1877) a Fr. officer, M. Zieger.

Alborak (Arabic *al-burâk*, from *baraka*, to flash, shine), the name given to an imaginary animal of a shining whiteness, on which, according to the Moslem tradition, Mohammed journeyed from the temple of Jerusalem to heaven.

Albornoz, Gil Alvarez Carillo (1310–67), cardinal, *b.* at Cuenca, created archbishop of Toledo in 1337 by Alphonsus XI. He fought against the Moors, but later went to Pope Clement VI. at Avignon, some say in flight from Pedro the Cruel. In 1350 this pope made him a cardinal, and in 1353 Innocent III. sent him as legate into Italy to negotiate the restoration of the church's temporal power. This he did, with the help of Rienzi.

Albox, a tn. of Spain in the prov. of Almeria. The tn. is noted for its biennial fairs. Pop. 11,000.

Albrecht, shortened from Adelbrecht, old high Ger. Adalperaht.

Albret (Lebret or Labrit), an anct. lordship of France, of which the fame centres on the Château d'Albret, the castle of one of the most powerful mediæval families of France. During the fourteenth-century wars many of its members espoused the Eng. cause. Henry IV., King of France, was the son of Jeanne d'A., Queen of Navarre, who had married Anthony de Bourbon, Duke of Vendôme.

Albright (Albrecht), **Jacob** (1759–1808), American clergyman, *b.* near Pottstown, Penn. Converted to Methodism in 1790, he preached that faith among the Pennsylv. Germans. Latter-day adherents of the church he founded are known variously as 'New Methodists' and 'Albrights.'

Albrizzi, Isabel Theotoki, Countess of (1770–1836), *b.* at Corfu, *d.* at Venice. She was witty, and the keenness of her intellect brought her in contact with the renowned literary men of her day. Byron, whom she met at Venice, called her Mme. de Staël of Venice. She is chiefly remembered by *Ritratti*, a series of por-

ts of famous Italian contempor-s and criticisms of plastic art.

Albrun Pass, a defile famous in the tory of brigandage leading from valley of Binn in Switzerland to e glen of Devero in Italy.

Albuera, Spanish vil. in prov. of adajoz, 13 m. S.E. of tn. of Badajoz. amous for the defeat of the Fr. under Iarshal Soult by the British and ortuguese, 1811. Pop. 800.

Albufera (Arabic, the water) is a ake in Valencia, Spain, separated rom the sea by a narrow tongue of and, but with which it is connected by canal. It abounds in wild fowl and fish, and its revenues were given to the Duke of Wellington. The Eng. were defeated by Suchet near Albufera, 1812.

Albugo, a term used in medicine to denote a white spot which appears on the cornea of the eye, and which is generally the result of inflamma-tion.

Albula Pass, in the Grisons (Switzerland), connects the valleys of the Rhine and Inn. A railroad has been constructed across it, making it now the shortest route into the Upper Engadine. Highest point 7590 ft.

Album (Lat. *albus*, white), a board (exposed in some public place such as the Forum), plastered or painted white, on which, in anct. Rome, were inscribed the public edicts and announcements. The name was extended to include the *Annales* of the Pontifex Maximus, the list of decurions, of jurors, etc. In modern times the name is applied to a note-book in which verses, sketches, autographs may be collected, or the larger books in which photographs are kept. In the middle ages any register or catalogue of saints, civil functionaries, etc., was called an A. On the Continent the term is now applied to the list of members of a university.

Albumazar (**Abu-Maaschar**), an Arab writer on astronomy or natural astrology, was *b.* at Balkh *c.* A.D. 805. His most famous work is entitled *De Magnis Conjunctionibus*. He also wrote *Introductorium in Astronomian* and *Flores Astrologici*. He held that the creation of the world took place when the seven planets were in conjunction in the first degree of Aries, and that the end of the world will come with a similar conjunction in the last degree of Pisces.

Albumen, in plants, is a white substance which contains food-material for the embryo, and is found in the seed. It is not a similar substance to the A. of an egg, the name was applied only by analogy, and a common name for it is *endosperm*. Plants are said to be *albuminous* (*e.g.* ash) or *exalbuminous* (*e.g.* pea).

Albumin, a term applied to a group of organic bodies of very complex structure. The chemical investigation and classification of these compounds is a matter of great difficulty, but there are certain important properties which are characteristic of the group generally. They contain five elements, the proportions of which do not greatly vary in the different members of the group: Carbon, from 50 to 55 per cent.; hydrogen, from 6·5 to 7·3 per cent.; nitrogen, from 15 to 17·6 per cent.; oxygen, from 19 to 24 per cent.; sulphur, from 0·3 to 5 per cent.

As. are colloidal substances, that is, they do not pass through parchment paper, and advantage is taken of this property to separate them from salts in solution. The addition of alcohol to the aqueous solution precipitates the A., and boiling with water produces coagulation. Different As. coagulate at different temps., and after coagulation all As. are insoluble in water and can only be made to dissolve by being treated with caustic alkalis or mineral acids.

The As. proper and the allied compounds are of great importance physiologically. With the exception of fats and mineral salts, all the dry material of animal bodies is made up of albuminous substances, or proteins, as they are sometimes called, according to the classification adopted. They are an essential part of every plant cell, and they form an indispensable constituent of human and animal food. The body can exist for a long time without fats or carbohydrates, but death is inevitable on the withdrawal of proteins from its nourishment. The chief proteins found in food-substances are egg-A. in white of egg, fibrinogen and hæmoglobin in blood, myosin in meat, caseinogen in milk, casein in cheese, and gluten in flour. In the process of digestion, proteins are split up into peptones, and these again into amino acids. The products of digestion go mainly to the blood-stream for the building up or repair of the tissues.

Egg-A., or white of egg, is used as an antidote to poisoning by corrosive sublimate, sugar of lead, and copper sulphate, as it forms insoluble compounds with those substances. It is also used in the refining of sugar and for fixing light shades in the colour printing of textiles.

Albuminoids, a term of double application. It is sometimes used as a generic term to denote those substances which resemble egg-albumin, such as myosin, casein, globulin, fibrin, and gluten. In anatomy the term has another use, denoting the connective substances composing the conn

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tissues, as collagen, keratin, fibroin, elastin, etc.

Albuminuria, the presence of albumin in the urine. The immediate cause is the escape of the blood albumins from the blood-vessels into the renal tubules. There may be definite lesions of the kidney, or the condition may be due to a variety of causes. Accidental or spurious A. is due to the presence of blood or pus from hæmorrhage, or disease of the ureters, bladder, or urethra. Febrile A. is a condition accompanying many fevers and rarely lasts longer than the fever. Cyclic A. derives its name from the periodic appearance and absence of albumin in the urine. The albuminuric paroxysms are generally absent at night, and appear to be the result of the assumption of the upright posture. It is most common in growing youths of poor nutrition and anæmic tendency, may submit to careful treatment, but on the other hand may lead to degeneration of kidney-structure many years later; hence the importance of an albumin test in connection with life-insurance risks. The simplest test is coagulation of the albumin. The urine is filtered to remove any turbidity, and if alkaline or neutral in reaction, a small quantity of acetic acid is added. A test-tube is filled about two-thirds full and the upper part of the column of urine carefully heated. Any turbidity that appears can be at once detected by comparison with the lower part of the column, and may be due to albumin or phosphates. If it is due to albumin, adding nitric acid will increase the turbidity; if to phosphates, the liquid will be cleared at once.

Albumosuria, a medical term used to denote a species of disease characterised by the presence of albuminous matter in the urine. It is often a symptom of bone disease, and is detected by the addition of nitric acid in the urine, which produces a milky turbidity, while in cases of the less serious disease, albuminuria, it produces opaline effects.

Albuñol, tn. in S. Spain, prov. of Granada, 40 m. S. of city of that name, near the coast of the Mediterranean, on which it has a port. It stands in a vine-growing dist., and exports almonds and wine. Pop. 9400.

Albuquerque: (1) City of Spain, prov. of Badajoz, 9 m. from the Portuguese frontier. It has cotton and woollen manufs., and was once strongly fortified. Pop. 11,141. (2) Co. seat of Bernalillo co., New Mexico, U.S.A., on the Rio Grande, and at the junction of the Atchison, Topeka, Santa Fé, and Pacific railroads. Gold, silver, and iron mines in vicinity. There are sev. important buildings and a brisk trade in wo and hides. Pop. 26,526.

Albuquerque, Affonso d', surname the Great (1453–1515), founder of th Portuguese power in the E., was b near Lisbon and spent his youth a the court of Alphonso V. Bein made viceroy of the Portuguese Indies, he took Goa, 1510, and then in rapid succession Malabar, Ceylon, Malacca, 1511, and later Ormuz, 1515. His rule was wise, firm, and humane. In 1515 Emmanuel recalled him, putting his personal enemy, Lopez Soarez, in his place. He *d.* at Goa. See *Commentarios do Grande Affonso Dalboquerque* (Lisbon, 1557), written by his son; translation pub. by Hakluyt Society. Also the second decade of Barros's *History of Portuguese Conquest in the East;* Maffei, *Historia Indica;* Lafitan, *Hist. des Conquêtes des Portugais dans le Nouveau Monde.*

Alburnum, or sapwood, is the wood lying immediately below the bark, in opposition to the duramen or heartwood in the central region. The duramen is the old wood which has grown harder, and incidentally darker, and has lost its functional activity; the A. is the new wood. Whitewood trees consist wholly of A., and are consequently fit only for temporary purposes.

Albury, tn. in New South Wales, Australia, at the head of the navigation of the Murray R., from the mouth of which it is 1800 m. distant. It is 386 m. S.W. of Sydney by rail. A. is the centre of an important vine-growing district. Pop. (1928) 9250.

Alby, tn. of France, dept. of Haute-Savoie, on the Chéran, 9 m. S.E. of Annecy; pop. less than 2000.

Alcæus (*c.* 600 B.C.), contemporary of Sappho, was one of the first lyric poets of Greece. Of aristocratic birth, he was yet a fiery democrat, and vigorously opposed both the tyrant Myrsilus and the popular ruler Pittacus. He wrote odes in the Æolic dialect, using the measure which bears his name. Fragments to be found in Bergk's *Poetæ Lyrici Græci.* Alcaics are of two kinds, the greater and the lesser. The greater alcaic is an eleven-syllabled line of five feet, viz. either a spondee or an iambic, an iambic, an extra long syllable and two dactyls. The lesser has four feet, viz. two dactyls and two trochaics. In Lat. the form was much used by Horace, A.'s great disciple.

Alcahest, a term introduced into alchemy by Paracelsus to denote the unknown 'quintessence' of creation, the one real elementary form of matter. He considered this as being the universal solvent that the alchemists sought.

Alcaide, or **Alcayde** (Arabic *Āl-Kayid*, the head or leader), a Sp. word formerly used to denote the governor of a fortress or a castle, a jailer or a warden.

Alcala de Guadaira, tn. of Spain, prov. of Seville, 7 m. E. of tn. of that name, supplies Seville with bread. Pop. 8000.

Alcala de Henares, anct. tn. of Spain, prov. of Madrid, on R. Henares, 17 m. E.N.E. of Madrid. Its famous university, founded by Cardinal Ximenes in 1510, was removed to Madrid in 1836. It is the bp. of Cervantes. Pop. 11,728.

Alcala la Real, city of Spain, prov. of Jaen (Andalusia), about 3000 ft. above the sea on N. side of the Granada Mts. In 1810 the Fr., under Count Sebastiani, defeated the Spaniards here. Pop. 17,046.

Alcalde (Sp. from Arab. *al-cadi*, the judge), general title for a judicial officer in Spain and parts of America settled by the Spaniards.

Alcamenes, a famous Athenian sculptor of the end of the fifth century B.C., possibly a pupil of Phidias. His best known works are a 'Hephæstus' and an 'Aphrodite of the Gardens.'

Alcamo, tn. on is. of Sicily, prov. of Trapani, at the foot of Mt. Boniface. Its buildings were erected chiefly by the Saracens, who possessed it until 1233. Pop. 32,211.

Alcañiz, city of Spain, prov. of Teruel, Aragon, on R. Guadalupe, 60 m. S.E. of Saragossa, has fine anct. buildings and important alum works. Pop. 8648.

Alcantara (Arab., the bridge) receives its name from the magnificent bridge built by the Emperor Trajan in the early second century. The bridge, surmounted by a triumphal arch, is over 600 ft. long and 200 ft. high, and is composed of six arches. It was partially destroyed in the Peninsular war, but has lately been reconstructed. Pop. 3000.

Alcantara, Knights of, founded as the Order of St. Julian, formed a military and monastic order for the defence of Spain against the Moors. The order was founded in 1156 and approved by Pope Alexander III. in 1177. In 1835 it was changed from an ecclesiastical to a court order.

Alcaraz, tn. of Spain, prov. of Albacete, on slope of mts. of Albacete and 34 m. W.S.W. of tn. of that name. Above it is a ruined castle, and there are remains of a Rom. aqueduct. Important copper and zinc mines are to be found in the vicinity. Pop. 5405.

Alcarria, La, a productive dist. in the prov. of Guadalajara, Spain. The market centre for the produce of this dist. is the tn. of Brihuega. Grain and fruit are the chief products.

Alcarsin and **Alcargin**, *see* CACODYL.

Alcaudete, a Sp. tn. in the prov. of Jaen, Andalusia. Pop. 10,000.

Alcazar, the name of sev. palaces of the Moors in Spain, the most important of which are: the two As. of Cordova—the 'A. viejo' built by the Arabs, and the 'A. nuevo' built by Alphonso XI. The A. of Segovia contained many art treasures, statues, and historical relics. It was, however, destroyed by fire in 1862. The A. of Seville was built by the Arabs in the twelfth century, and has been enlarged sev. times, presenting a mixture of Oriental and Gothic architecture. It contains many valuable curios. Toledo had five As., of which the most beautiful was destroyed by fire in 1710, and that of Alphonso VIII. has been converted into a monastery.

Alcazar, a Sp. tn. in the prov. of Ciudad Real, New Castile. It is generally believed that this is Alce, the scene of the victory of Tiberius Sempronius Gracchus in 180 B.C. Pop. 13,647.

Alcazar-kebir, city of Morocco, an important caravan centre. Here, in 1578, Sebastian of Portugal was defeated and slain by the Moors. Pop. 9000.

Alcedo, a genus of kingfishers which belongs to the family Alcedinidæ, and is allied to the hoopoes and hornbills. *A. ispida* is the European species of kingfisher.

Alcedo y Herrera lived in Sp. America during the eighteenth century. He was an army officer and also a writer of histories which were particularly valuable in his own day and still throw light on the history of Sp. America. His best known work is *Diccionario geográfico—histórico de las Indias Occidentales, etc.* (Madrid, 1786–89), translated by G. A. Thompson (London, 1812–15).

Alces (Gk. ἀλκή, strength), scientific name for the elk (*q.v.*).

Alcester, Frederick Beauchamp Paget Seymour, Baron (1821–95), an Eng. admiral, *b.* at London. Began his naval career in 1834, and commanded the *Meteor* in the Crimean war. He was commander-in-chief in the Mediterranean from 1880 to 1883, and directed the bombardment of Alexandria in 1882. For this and other services during the war he was created Baron in 1882. In 1886 he retired.

Alcestis, the subject of the tragedy of Euripides, was the daughter of Pelias and Anaxibia, and wife of Admetus, who won her by Apollo's aid. When the time came for her husband to die, she consented to give

her life for him, and was eventually brought back from the lower world.

Alchemilla, a genus of the Rosaceæ growing in tropical and temperate climates. *A. arvensis*, *A. alpina*, and *A. vulgaris*, or lady's-mantle, are found in Britain. They have no corolla, and only four sepals.

Alchemy, usually associated with the magic arts and with astrology, but in reality the beginning of our systematic chemistry. The origin of the word is variously given, being derived from the Gk. and from the ancient Egyptian, via Arabic. The art probably had its origin in Egypt, since Egypt possessed a civilisation and culture far in advance of that of any contemporary nation. It is therefore not surprising to learn that the earliest mention of A. is to be found in the records of the Egyptians. Legend after legend grew up and was perpetuated in some way or another by writings regarding the origin of this very mystical science. The origin is variously attributed to Hermes Trismegistos ('the three times great'), to the fallen angels of the Book of Genesis (ch. vi.), and yet again by revelation to Moses and Aaron. The origin through Hermes is the one which was most generally accepted, and also the one which has affected chemical language down to the present day (*e.g.* hermetically sealed). He was the Egyptian ideal of personified strength, the great god Thoth, and his divine art of A. was a secret revealed only to a sacred school of the sons of kings. Astrology and magic were the accompanying sciences of A., and that whole science was based upon the transmutation of metals, which seems from the researches of Berthelot, in his study of the third century A.D. Leyden papyrus (found in Thebes in the nineteenth century), to have undoubtedly originated in Egypt. During the fourth and fifth centuries the writings of the alchemist continued increasing until by the end of the fifth century we may say that speculative A. had reached its highest point in the Alexandrian schools. The results of the appearance of the Muslims into the civilised world did not at first promise to further the arts and sciences, but within a short time of their appearance the Muslim schools began to become famous, and the names of many Arabs and Persians are amongst the most famous of the alchemists. The most famous of these Muslim alchemists was Jabir ibn Hayyan, known to the west of Europe as Geber. His name is bound with the chemical knowledge of the time, but much that has been attributed to him has been found to be spurious, and many of his so-called writings are writings of a much later date. His own ideas were very similar to those of the old Alexandrian philosophers, and he believed even in the influence of the planets on metals.

The theory of transmutation, although modified to a certain extent by the later alchemist, can be traced quite easily in the writings of the Gk. philosopher. All substances were ultimately composed of one elemental matter, and so the alchemist hoped to be able by the removal of all the other foreign matter to obtain the *materia prima*. This theory of A. still existed amongst the alchemists of the middle ages; that they believed in it as firmly as did the ancients cannot perhaps be definitely stated. Men such as Albertus Magnus, Roger Bacon, Arnold of Villeneuve (*q.v.*), and Vincent of Beauvais all held these beliefs. Roger Bacon, to quote only one example of this period, believed in the philosopher's stone, which was to turn the baser metals into gold, and also in the elixir of life. When it is remembered that numerous ideas of Roger Bacon were far beyond his time, it will be seen that the alchemistic ideas had a very strong hold indeed. To come down to almost modern times, certainly well into the seventeenth century, these alchemistic ideas were still held, at any rate from the academic point of view, by the chemists of the period. Amongst them may be mentioned Glauber (1603–68), Robert Boyle (1627–91), and for some time Newton and Leibnitz, and even Dr. Johnson, who was interested in chemistry. The science has been adhered to by some right down to the present century, and recent alleged successful transmutations have been reported from Armenia and France. With the twentieth century and the research into radio-activity, helium has been produced by radium, and this has been held to be the change of one element to another. The views of the alchemist do certainly not receive support here, but the essential principle underlying all the experiments of A. seems to have received some little encouragement. *See* Albertus Magnus; A. E. Waite, *Lives of the Alchemists*, 1888; Berthelot, *La Chimie au Moyen Age*, 1893; E. O. von Lippmann, *Die Entstehung und Ausbreitung der Alchemie* (Berlin, 1919).

Alciati, Andrea (1492–1550), It. jurist and poet, *b.* at Milan, *d.* at Pavia. He was professor of civil law at Avignon, Pavia, and Ferrara. His refined legal criticisms make him founder of the 'elegant' school of law. He made commentaries on the Pandects and on the Justinian code.

His criticisms of Rom. law were a revolution in legal history. His book of epigrams on his contemporaries called *Epigrams* (*Emblematum Libellus*) is famous.

Alcibiades (450–404 B.C.) was *b.* at Athens and was connected through his mother with the house of the Alcmæonidæ. He was left an orphan at a very early age, and this lack of proper control during his youth probably accounts for some of his later excesses. Socrates, who saved his life at Potidæa, and whose life he saved at Delium, obtained some influence over him and tried to eradicate his vices, but with very little effect. After the battle of Debium, 424 B.C., he married Hipparete, and at this time he began to turn his attention to public affairs. He wished to ally himself with the Spartans, but on their choosing his rival Nicias to negotiate for them in 421 B.C. he immediately became their enemy. Instead of taking part in the Sicilian expedition of 415, he again joined them, escaping to their country because he was accused of the mutilation of the images of Mercury. He now became the enemy of the Athenians; but he soon forsook the cause of the Spartans and tried to get the Athenians to recall him, promising them an alliance with Tissaphernes, the Persian satrap. This plan was not successful, but he was eventually recalled to Athens by Thrasybulus. In 407 B.C., on his return to that city, he was completely restored to his former position, but had his command taken from him the next year. He then chose exile as his only means of safety, and in 404 B.C. he went to take refuge with Pharnabazus, wishing to go thence to the court of Artaxerxes. He was prevented from doing so, however, for while there his residence was set on fire. In trying to escape the flames he rushed from the house to fall pierced by the arrows shot by emissaries of the Spartans. *See* Thucydides' *Histoire d'Alcibiade* (Paris, 1873) by H. Houssaye, and Plutarch's *Lives*.

Alcidæ, the auks, belonging to the Charadriiformes, and are allied to seagulls. They have webbed feet and fly well. They live on rocks, lay a single egg, and feed on fish. *Alca impennis*, the great auk, now extinct, had short, useless wings; *A. torda* is the razorbill; *Mormon arcticus* is the puffin.

Alcides, *see* HERCULES.

Alcinous is famous in the story of the Argonauts and in that of Odysseus. He was the son of Nausithous and grandson of Poseidon. The Argonauts and the Colchians visited the is. of Drepane, the abode of A. The Colchians demanded Medea, but owing to Arete, wife of A., they were unable to obtain her.

Alciphron lived probably during the second century A.D., though there is great doubt as to his exact century. He was a Gk. writer, and is noted especially for a collection of letters voicing the opinions of various classes of people on certain subjects. The scene is laid in Athens, and the letters are written in the Attic dialect.

Alcira, a Spanish tn. in the prov. of Valencia. A., which consists of the tn. proper and two suburbs, was built by the Carthaginians, and in mediæval times belonged to the Moors. It is believed to have been the Rom. tn. of Sætabicula, and was originally a strong fortification, being very thickly walled. Its staple products are silk and fruit. Pop. 22,657.

Alclyde, *see* STRATHCLYDE.

Alcmæon, the son of Amphiaraus and Eriphyle, was commanded by his father—who knew he would perish at Thebes—to slay his mother for bringing about her husband's death by persuading him to go against Thebes. He carried out this injunction on his own return from Thebes, and was pursued by the Furies in consequence. He was first cured of his madness by the King of Psophis, whose daughter Arsinoë he married, and after his second fit of madness by the river-god Archelous, whose daughter Callirrhoë he also married. His treachery was discovered by Arsinoë's father, whose sons murdered him.

Alcmæonidæ, a noble family of Athens much in evidence from about the eighth to third century B.C., supposed to have come originally from Messenia. Megacles, a notable member of this family, caused its banishment from Athens in the sixth century B.C., on account of his sacrilegious treatment of Cylon and his colleagues who were conspirators. After this they returned to Athens, but were again banished by Pisistratus. They were eventually restored by the Spartans after the latter had brought about the banishment of Hippias in accordance with the utterances of the Delphic oracle. Cleisthenes was at this time the head of the family, and he joined the followers of Pisistratus.

Alcman, *b.* at Sardis during the seventh century B.C., was a lyrical poet of Gk. extraction. He settled in Sparta, where, among other kinds of poetry, he wrote in the Doric dialect parthenic choruses sung by the young girls of Sparta. He is said by some to have been the first writer of love poetry. The fragments of his poems which are extant are to be found in Bergk's *Poetæ Lyrici Græci*, Leipzig, 1843.

Alcobaça, a tn. in Estremadura, near Lisbon, Portugal, at the confunction of the Alcoa and the Baca. Its chief historic interest is a superb Cistercian monastery founded in 1148 by Don Alfonso. The old Gothic church holds the tombs of Alfonso I. and II., Sancho I., Pedro I., and his ill-starred mistress Ines de Castro. The library is extensive. Pop. 2400.

Alcock, John (c. 1430–1500), was an Eng. ecclesiastic. He was the founder of Jesus College, Cambridge.

Alcock, Sir John William (1892–1919). A distinguished British airman who, with Sir Whitten Brown, made the first trans-Atlantic flight (*see* ATLANTIC FLIGHTS); but subsequently lost his life on a flight to France.

Alcock, Sir Rutherford (1809–97), son of a London doctor, and himself educated as a surgeon. He became consul at Amoy and Fuchow in 1844, at Shanghai in 1846, consul-general in Tokio in 1858, and minister-plenipotentiary the following year. During the troublous years that followed he showed himself to be fearless and determined. From 1865 to 1871 he acted as minister-plenipotentiary at Peking. Returning to England, he was elected president of the Royal Geographical Society in 1876. His pub. works include: *Life's Problems*, 1857; *Capital of the Tycoon*, 1863; *Art and Art Industries in Japan*, 1878. See *The Englishman in China during the Victorian Era*, by A. Michie, 1900.

Alcoforado, Marianna (1640–1723), a nun of Beja in Portugal, and the author of the famous *Lettres Portugaises*, 1669, a series of love-letters to the Count of St. Léger, marshal of France. The letters are fervid and passionate, and became known throughout Europe.

Alcofribas Nasier, the pseudonym used by Rabelais when he pub. *Pantagruel*. The name is obtained by changing the order of the letters of his own name, François Rabelais.

Alcohol, a term applied to a group of organic substances which may be egarded as derived from the hydroarbons by the substitution of one or nore univalent hydroxyl groups OH or the same number of atoms of ydrogen. The name A. is, however, sually applied to one member of that roup, ethyl A., which is present in rying quantities in wine, beer, irits, etc.

The aliphatic A. series contains thyl, ethyl, propyl, butyl, amyl, yl As., etc., and their isomerides. e lower As., from methyl A. to yl A., are mobile liquids, the mid- As. are oily liquids, and the upper are waxy solids. The lower As. e a characteristic spirituous smell which becomes disagreeable hig up in the series. The most importa members are methyl A. and ethyl

Methyl alcohol ($CH_3 \cdot OH$) is pr duced in the dry distillation of woo The aqueous product of the distill tion contains about 1 to 2 per cen of methyl A., which can be separat by fractional distillation after th removal of the acetic acid by ho milk of lime. Methyl A. is used i the preparation of aniline dyes an for the denaturation of ethyl A. I is now prepared synthetically, on a large scale, from carbon monoxide and hydrogen, which are made to react under pressure, at 450° C., in the presence of metallic oxides; the latter act as catalysts.

Ethyl alcohol ($C_2H_5 \cdot OH$) has been known from the earliest times as produced in the fermentation of grape juice. When pure it is a mobile colourless liquid with a characteristic odour. It solidifies at about −130° C., hence its use in thermometers intended to register low temperatures. It is miscible with water in all proportions, and burns with a pale blue non-luminous flame. In the laboratory it may be prepared by converting ethane into ethyl chloride and heating the latter with dilute alkalis under pressure. A. is always prepared for commercial purposes by making use of the process of fermentation (*q.v.*). Dextrose, or grape-sugar, decomposes in the presence of yeast-cells into A. and carbon dioxide, and the dextrose is obtained by making a pulp of any starchy material, such as potato, grain, rice, etc. By enzymes (*see* FERMENTATION) the starch is almost completely turned into maltose, which by combining with water is converted into dextrose. The weak solution of A. thus obtained is subjected to fractional distillation. The distillate or 'raw spirit' contains 'fusel oil,' which is contained in the higher boiling-point fractions. To eliminate the fusel oil, the raw spirit is diluted with water and filtered through charcoal, which absorbs some of the fusel oil. The filtrate is again distilled and collected in three fractions, that of the lowest boiling-point being fairly pure A. For most purposes it is unnecessary to get rid of the fusel oil; even beer and whisky contain a small quantity of this substance, which is supposed by some to improve the flavour; it is, however, undoubtedly injurious to health.

In the British Isles a heavy excise duty is levied on 'spirits of wine,' but the gov. allows certain exceptions in order not to hamper the various industries in which A. is used. Methylated spirit contains 10 per cent. of partially purified wood-spirit and a

small proportion of paraffin oil, which render it undrinkable. It is also coloured with an aniline dye. This spirit is sold duty free, and in cases where the paraffin oil would militate against certain manufacturing processes, the spirit may be supplied to manufacturers denaturated with wood-spirit only. For laboratory purposes in universities and colleges the sale of pure A. is allowed free of duty. Ethyl A. completely free from water and other impurities is known in chemistry as 'absolute' A.

The great solvent powers of A. have made it of great importance in the preparation of lacquers, varnishes, and dyes. It is used also for the manuf. of chloroform, chloral, and iodoform, and as a fuel. Its solvent power also makes it valuable in the chemical laboratory, and it is used too for the preservation of anatomical specimens.

The most important fact in connection with A. is the part it plays in the preparation of alcoholic liquors. A vast mass of legislation and of administrative detail, great industries like brewing and distilling, and social and hygienic problems are all cognate to this subject. *See* BREWING, DISTILLING, DRUNKENNESS, EXCISE, LICENCE.

Alcoholic liquors may be divided into two classes: those which are distilled and therefore contain a large proportion of A., and those which are the result of fermentation without distillation, and therefore depend for their flavour mainly on the medium in which the fermentation takes place. Of the distilled liquors the chief are brandy, distilled from wine; whisky, from a fermented solution of malt; rum, from a fermented solution of sugar; and gin, from a fermented solution of malt, but flavoured with juniper. Those not distilled comprise beer, which is fermented malt solution flavoured with hops, and wine, which is fermented grape juice. Beer, with its modifications, stout, porter, and the various kinds of ales, usually contains from 3 to 7 per cent. of A., and wines from 8 to 17 per cent. Port, sherry, and madeira are what are called fortified wines, that is, they contain added A. besides that engendered by the fermentation.

The physiological effects of A. are well known. It is a powerful stimulant, increasing the flow of gastric juices when diluted, and in more concentrated doses producing a stronger and more rapid heart-beat. The possible effects of its continual use are catarrh of the stomach, affections of the liver and kidneys, degeneration of the brain, and delirium tremens. Notwithstanding its therapeutic value, medical men are increasingly unwilling to advocate its use, owing to the bad physical effects and the worse moral degeneration consequent upon the A. habit which might possibly be established.

Alcoholism, the condition of the body brought about by over-indulgence in alcohol. It includes a morbid state of the liver, kidneys, stomach, etc., but is particularly associated with a condition of the nerves which gives rise to a persistent craving for alcohol. The desire for drink passes after a time into a physical condition in which the body demands its accustomed allowance of alcohol, and acute nerve troubles are generally the result of its being withheld. Such a condition, however, is merely temporary, and the body gradually accommodates itself to new circumstances. For diseases associated with the condition of A., *see* DELIRIUM TREMENS, INSANITY, EPILEPSY, and NEURITIS. The general aspects of excessive drinking will be found in DRUNKENNESS.

Alcoholometry, the determination of the proportion of alcohol in a liquid. If the liquid is known to contain only alcohol and water, its sp. gr. as shown by a hydrometer would enable the relative proportions of water and alcohol to be known. In hydrometers used for this purpose the graduations are often marked in percentage of alcohol instead of specific gravity. In Sykes's hydrometer the graduations give percentages by volume of 'proof-spirit' in the spirit examined, and Atkins's hydrometer is provided with a series of scales which enables the strength of any 'wort,' or beer in the making, to be determined.

Alcoran, *see* KORAN.

Alcott, Amos Bronson (1799–1888), an American philosopher, *b.* in New Haven co., Connecticut. He opened in 1834 a small school in Boston which has been vividly described in *Recollections of a School*, a book written by Miss Peabody. His methods of education did not find favour at Boston, and finally he went to Concord, where he occasionally lectured to schools on philosophical subjects. He was the friend of Emerson, Thoreau, Hawthorne, and Carlyle. His theory was Neoplatonic. He was made dean of the Concord School of Philosophy in 1879. Of his writings the best known are: *Orphic Sayings*, *Concord Days*, *Table Talk*, and *New Connecticut*.

Alcott, Louisa May (1832–88), author, *b.* in Pennsylvania, the daughter of Amos Bronson Alcott, *supra*. Her principal works are stories written for girls, among these being *Little Women*, 1868, with a sequel, *Good*

Wives, and *Little Men*, 1871. Before this ... wrote *Hospital* ... rs describing her ... during the civil



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war of 1862–63; also *Aunt Jo's Scrap-bag*, 1871–79; *Jo's Boys and How they Turned Out*, 1886. See Ednah D. Cheney's *Louisa May Alcott*, 1889.

Alcove (Fr. *alcôve*, Arabic *al-qobbah*, arch, vault, tent), a recess which is covered in. This term is usually applied to a small room joined to a larger one, or to a recess in a room used for the reception of a bed.

Alcoy, a Sp. tn. in the prov. of Alicante. It has a picturesque situation, and is noted for its manufs. It is especially famous for its manuf. of paper, particularly that used for cigarettes; but there are also cotton, linen, and woollen factories. Pop. 34,000.

Alcudia, Don Manuel de Godoy, Duke of (1767–1851), a Sp. statesman, who for his share in bringing about peace with France received the title 'Prince of Peace.' Though a great favourite of Charles IV., he was unprincipled in his administration. See *Trafalgar*, by Galdós.

Alcuin (735–804), a celebrated A.-S. scholar. He was *b.* at York, and educated at the cathedral school there, apparently under the direction of the great scholar Ælbert, whom he succeeded in the headship of the school. With Ælbert he seems also to have made a journey to Rome. At Parma about the year 780 he met the Emperor Charles the Great, who gave him rich abbeys and persuaded him to settle down at his court. This was part of Charles's plan for the civilisation and education of his Franks. He desired also his help in the creation of schools, and round A. grew up a school at the royal court composed of the young princes and nobles of the palace and sometimes even the great Charles himself. During the period of his greatness he seems to have visited ... which he was ... but its stress ... place for the great scholar, and after 796 he settled down in the abbey of St. Martin's at Tours. His works are not famous for their depth, but his letters to his various friends form perhaps the best reflection of the life and manners of his times that we have. A number of his letters and works are still in existence; his two chief correspondents were Arno of Salzburg and the emperor himself. Of his other works we have also quite a number, including a grammar and a number of Lat. verses. His life of Saint Willibrord, to whom he was related, is one of a number of the lives of saints written by him. See *Beati Flacci Albini seu Alcuini Opera*, Ratisbon, 1777; Werner's *Alkuin und Sein Jahrhundert*; West's *Alcuin and the Christian Schools*, 1893; and Gaskoin's *Alcuin, his Life and Work*.

Alcyon, or **Halcyon**, was the daughter of Æolus and wife of Ceyx. One legend says that she and her husband were changed into birds for calling themselves Zeus and Hera, and another that they were both changed into kingfishers after Ceyx was shipwrecked and Alcyon had thrown herself into the sea in her grief. 'Halcyon days' were supposed to be days of calm while the kingfisher (alcyon) was breeding.

Alcyonacea, a sub-order of Alcyonaria (*q.v.*), an order of marine animals. They consist of a firm cartilaginous mass, throughout which calcareous spicules are dispersed. The surface is studded with hydra-like polyps, with tentacles. They are found attached to rocks and seaweed. *Alcyonium digitatum* is popularly called 'dead men's fingers'; *A. gelatinosum* is phosphorescent and inhabits deep water.

Alcyonaria, an order of marine animals belonging to the Anthozoa. They are coral polyps with eight tentacles round the mouth and eight mesenteric folds.

Aldan, a navigable riv. of Siberia,

and affluent of the Lena. It travels over a course of 1300 miles.

Aldborough, a vil. in the W. Riding of Yorkshire, on the R. Ure. Remains of the anct. Rom. tn. of Isurium have been found in the neighbourhood.

Aldebaran is the Arabic name of a first-magnitude star (α) in the constellation Taurus, its exact magnitude being 1·1. It is of a light-red colour, and is one of the group of five called the 'Hyades.' It is sometimes called 'The Bull's Eye.' The Roms. knew it by the name of 'Palilicium,' because it set for the last time visibly when the feast of Pales was being celebrated.

Aldeburgh, a tn. in Suffolk. It used to send members to parliament, but in 1832 this privilege was taken away. Its church, containing a statue of Crabbe the poet, who was born there, and its Moot Hall are worthy of note. A. also has the distinction of being the first tn. in England to elect a woman to the office of mayor, this honour being conferred on Mrs. Garrett-Anderson in 1908. Pop. 2889.

Aldegonde, Philip van Marnix de, Saint, *see* MARNIX, PHILIP.

Aldegrever, Heinrich (1502–58?), was *b.* in Westphalia. He is sometimes known under the name of Aldegrave, and was a clever artist and engraver. By virtue of his engravings, which were of extremely delicate workmanship, he held one of the foremost places among the Ger. 'Little Masters' of the sixteenth century. Very few of his paintings are known to be authentic pictures, though there are works attributed to him in some of the galleries on the Continent. His prints are very numerous, exceeding 300, and they bear dates between 1522 and 1562. His paintings are in the same style as his engravings.

Aldehyde, the name applied to a group of organic compounds prepared by oxidation of primary alcohols. The term is derived from *al*cohol *dehyd*rogenatum, that is, dehydrogenated alcohol. When oxidised, the As. give fatty acids; formaldehyde produces formic acid, acetaldehyde produces acetic acid, propaldehyde produces propionic acid, and so on. Therefore the As. may be looked upon as intermediary between the alcohols and the fatty acids.

The lower members of the group are colourless, mobile, neutral volatile liquids, usually with an irritating smell. The higher members are odourless solids.

The As. may be prepared by oxidising the primary alcohols, or from the fatty acids by dry distillation of their calcium salts with sodium formate. All the lower As. form crystalline addition products when shaken with a concentrated aqueous solution of sodium hydrogen sulphite. In contact with an aqueous solution of hydrocyanic acid, *cyanohydrins* are formed, which may be converted into hydroxy-acids.

The chief members of the group are formaldehyde and acetaldehyde. *Formaldehyde* ($H·CHO$) is prepared by the oxidation of methyl alcohol. It is a product of the incomplete combustion of wood, peat, etc., and traces of it are found in the atmosphere. It is a gas at ordinary temperatures, but can be condensed to a colourless liquid and even to a white solid. 'Formalin' is a 50 per cent. aqueous solution of formaldehyde; it is used as a disinfectant and for the preservation of anatomical specimens. Formaldehyde is also important as the source of 'bakelite' and 'galalith,' two useful substitutes for bone and ivory. The former is made from formaldehyde and phenol ('carbolic acid') and the latter from formaldehyde and casein of milk. *Acetaldehyde* ($CH_3·CHO$) is formed by the oxidation of ethyl alcohol. Commercially, acetaldehyde is obtained by causing acetylene (C_2H_2) to combine with water (H_2O) under the influence of a catalyst. It is a very volatile liquid with a penetrating odour, and on exposure to the air gradually oxidises to acetic acid. The term 'aldehyde,' when used without qualification, often refers to this compound. Acetaldehyde is of importance in the chemical industry.

Aldeia Gallega, a tn. in the prov. of Estremadura, Portugal, on the estuary of the Tagus near Lisbon. Pop. 8200.

Alden, Henry Mills (1836–1919) an American editor, born near Danby, Vt., graduated at Andover Theol. Sem., 1860. Editor of *Harper's Magazine*, 1869; author of *God in His World*, 1890; *A Study of Death*, 1895; *Pictorial History of the Civil War*.

Alden, John (1599–1686), one of the Pilgrim Fathers who sailed for America in the *Mayflower*. In the *Courtship of Miles Standish* Longfellow tells the story of his courtship of Priscilla Mullens.

Alder, *see* ALNUS.

Alderman, a title handed down from A.-S. times, the word then being 'ealdorman.' In those times the title was held by various distinguished persons, and in the very earliest times the ealdormen came next to the king. These ealdormen were nobles by birth, and their office was both civil and military. There were also special titles applicable to certain offices, such as 'Aldermanı

liæ,' 'Aldermannus regis,' and others. They seem to have been at the height of their power during the time of Alfred the Great, and from then until the time of the Norman Conquest the nature of the office gradually changed, until the word was applied to men holding certain municipal offices.

In modern times A. are members of the tn. and city corporations, and hold certain powers in those places. In the City of London, which is divided into twenty-six wards, there are twenty-six A., and the lord mayor is elected from among the A. In England, Wales, and Ireland A. possess, by virtue of their office, certain judicial powers in their own particular cities and tns., but in America they have powers of legislation rather than of judicature except in some cases. As each American city is governed under the laws of its own special charter, and as the provisions of these charters vary greatly, such an official as an Alderman has vastly different powers in different places. For example, Chicago is governed by Supervisors, Boston by an elected Council, Washington by Commissioners and New York by a Board of Aldermen directly representative of the popular vote. Broadly, however, Aldermen in America form legislative bodies, and though they have the powers of magistrates in some cases, these powers are of a restricted nature, relating particularly to civic business, the control of the police, and similar functions. In New York or in other American cities where the Aldermen are the controlling body, the powers of these officials are far greater than are usually associated with the office in England, but the Mayor, who is their chief and who is elected by the whole city, has also a large authority in the initiation and veto of measures.

Alderney is one of the group of is. known as the Channel Is., and lies N. of Jersey and Guernsey. It is separated from the Fr. coast by a strait known as the Race of A., and to the W. of this is. lie the 'Casquets,' dangerous rocks which have been the scene of many shipwrecks. The coast is mainly rocky, though on the N. there are bays. The tn. of St. Anne stands in the centre of this is., where he soil is very fertile. The is. itself s subject to the jurisdiction of uernsey, and belongs to Great ritain. Pop. about 1600.

Aldershot, a tn. in Hampshire, Eng-nd. At first only a small vil., it grew to importance owing to the establish-ent of A. Camp in 1854–55, on the rders of Hampshire, Surrey, and rkshire, which is the largest per-anent military camp in the United ngdom. The barracks and grounds cover an area of nearly 3 sq. m. first there were only wooden huts, these are being replaced by b huts and barracks, and there is a a brick hospital. The bell in t tower of the Cambridge Hospital made from guns captured at Seba topol. The gov. grounds around a used for manœuvres, and during t summer regular troops are encampe there, and Territorial Army units als go there for a fortnight. In the earlie years the troops quartered here wer termed the 'Division of Aldershot. In 1870 they and their station be came the 'Aldershot District,' and in 1901 the 'First Army Corps (Alder-shot District).' In 1902 the name was changed to the 'First Army Corps (Aldershot Command),' and in 1904 it became the 'Aldershot Com-mand.'

It is estimated that about 3,000,000 men were stationed in the Aldershot Command during the Great War; and it was from A. that most of the 'contemptible little army' went out to Flanders. The highest number stationed in the command at one period was 140,000. There were 60,000 troops on Laffan's Plains for Queen Victoria's Jubilee review, and nearly 100,000, including detachments from every part of the Empire, on the occasion of Queen Victoria's Diamond Jubilee Review. Pop. 28,764. *See* Murray's Handbooks, *Surrey*.

Aldhelm, St., *see* EALDHELM.

Aldine Press, *see* MANUTIUS.

Aldred or **Ealdred**, an Eng. churchman who became abbot of Tavistock about 1027; in 1044 he became bishop of Worcester, and in 1060 archbishop of York. He it was who carried on the negotiations with the Emperor Henry III. for the return to England of Edmund Ironside's son. He visited Jerusalem, being the first Eng. prelate to do so, about the year 1058. He surrendered to William after Hastings.

Aldrich, Henry (1674–1710), was an Eng. ecclesiastic, educated at Westminster School and Christ Church, Oxford, where he succeeded Massey as dean in 1689. He wrote *Artis Logicæ Compendium*—used at Oxford for a long time; also a composer of anthems. He designed Peckwater Quadrangle and All Saints' Church at Oxford.

Aldrich, Nelson Wilmarth (1841–1915), Amer. politician, *b.* at Foster, Rhode Is. In 1876, as Speaker of the Lower House of the Rhode Is. Legislature, he was a power in Republic state politics. In 1878 and 1880 he was elected to Congress, becoming senator in 1881. He served as senator until 1911, when he retired to devote his time to the National Monetary Commission, of which he was chairman.

Aldrich, Thomas Bailey (1836–1907), was an American poet, *b.* at Portsmouth, New Hampshire. While engaged in office work in New York he began his career as a journalist, and wrote for sev. magazines there, for a time editing the *Atlantic Monthly*. *The Story of a Bad Boy*, 1870; *Prudence Palfrey*, 1874; and *The Queen of Sheba*, 1877, are some of his novels, while among his best-known verses are *Cloth of Gold*, 1874.

Aldridge, Ira (1805–67), a negro who went to Glasgow in 1825 to study for a missionary. He, however, gave up the idea, and in 1826 acted as Othello in a London theatre. In 1852 he went to the Continent, where he was held in great reputation as an actor in Shakespeare's plays. He died at Lodz in Poland.

Aldringen or Aldringer, Johann, Count (1588–1634), was *b.* at Diedenhofen, Lorraine. He fought in the Thirty Years' War in the imperialist interests, and won distinction thereby.

Aldrovandi, Ulysses (1522–1607), a celebrated Italian naturalist, *b.* at Bologna. In 1553 he took his medical degree at Bologna, and occupied the botany and natural-history chairs of that university. He estab. the Botanic Gardens at Bologna in 1567, and also formed a natural history museum. He travelled in almost every part of Europe to collect information for his great work on natural history, the first vol. of which was pub. in 1599. The complete work was not pub. until 1608. He was imprisoned as a heretic at Rome, but was afterwards released.

Aldus, *see* MANUTIUS.

Ale, generally a synonym for beer (*q.v.*). The application of the term varies according to locality, but it is never used to denote the black beers, stout and porter. Mild A. is beer with a good proportion of sugar and a fairly dark colour. Pale A. usually differs little from what is known as bitter beer; it is light in colour, and has a pronounced hop flavour. The term 'ale' often has a connection with the periodic or festive nature of brewing or drinking, as in October A., Whitsun A., audit A., harvest A., and bridal (originally bride-ale).

Aleander, Hieronymus (1480–1542), cardinal, *b.* near Venice. He is noted for his persecutions of Lutheranism, and was present at the Diet of Worms. He compiled a Greek-Latin lexicon.

Aleardi, Aleardo (1812–78), an It. revolutionist and poet. He was professor of æsthetics in the Academy of Fine Art at Florence. His poems called *Canti* reveal the writer's elegant tastes and fervent patriotism.

Aleatory Contract (Dice-players' Contract), a legal term used of an agreement involving risk of loss or the chance of gain and dependent on a hazardous event. Under this head are wagers and insurance.

Ale-conner, or Ale-kenner, is one who knows what good ale is. In anct. times in this country As. or ale-tasters (called 'gustatores cervisiæ') were appointed annually in the court-leet of each manor, in boroughs and corporate tns., to see that the ale was good, and that it was sold at proper prices. In the City of London they are appointed to examine the ale and the measures in which it is sold.

Alecsandri, *see* ALEXANDRI VASILIO (BASIL).

Alecto, in Gk. mythology the sister of Megæra and Tisiphone. These three sisters were known as the Erinnys or Furies, and pursued the guilty. The most famous victim of their vengeance was Orestes, pursued on account of the murder of his mother, Clytemnestra.

Alegria, a tn. in the is. of Cebu of the Visayas group in the Philippines.

Alehouses were houses where ale was sold. In 1496 an act passed 'against vacabounds and beggers' (11 Hen. VII. c. 2) contained a clause regulating A., and from that time different acts were passed for that purpose. In 1828 a general act to regulate the granting of A. licences was passed (9 Geo. IV. c. 61), which repealed all former statutes on this subject. *See* LICENSING LAWS.

Alekhine, Aljechin Alexander (*b.* 1892). *Chess-master, and formerly a* Russian civil servant. Son of a Russian nobleman and a member of the Douma, his career was broken by the Revolution and he emigrated to France. He won the title of 'Master' at chess in 1909, and that of 'Grand Master' in 1914; and by defeating Capablanca Nov. 1927, he became the World's Champion. Also holds the record for blindfold chess.

Aleman, Mateo, a famous Spanish novelist, was *b.* at Seville about the middle of the sixteenth century, and *d.* in Mexico in 1610. He was the author of the famous and popular *novel entitled Guzman de Alfarache*, Madrid, 1599. This work, which has been translated into Eng., is one of the many novels called 'Picarescas' which about that time appeared in Spain, and professed to describe the life and manner of rogues, vagabonds, and beggars. A.'s style is pure, but often vulgar and even indelicate. A work of Le Sage bears the title of *Guzman Alfarache*, but has no resemblance to the novel of A. In 1604 A. pub. a life of St. Antonio de Padua, and in 1609, in Mexico, pub. *Ortografia Castellana*.

Alemanni, Alamanni, or Alamans

(Old Ger. *alle mann*, all men), a warlike confederacy of sev. Ger. tribes which was formed between the Danube, the Rhine, and the Main about the second century A.D. and from the third to the fifth century, frequently was at war with the Roms. Caracalla (A.D. 214), Severus, Maximinus, Postumus, Julian, and Valentinian were successively their opponents, but they were not crushed until Clovis defeated them utterly in the battle of Tolbiac, 496. At one time they extended their dominions to the Vosges and to the Alps. It is from this people that the Fr. derived the words Allemagne and Allemand for 'Germany' and 'a German' respectively.

Alembert, Jean le Rond d' (1717–83), was *b.* in Paris, and obtained his name from S. Jean le Rond, the church near which he was found when a baby. In 1741 he became a member of the Academy of Sciences, and in 1743 pub. his work, *Traité de Dynamique*, explaining 'A.'s Principle.' He helped Diderot to prepare his *Encyclopédie*, and was in 1754 admitted to the Académie Française. *See* Condorcet's *Eloge*, 1784.

Alembic, an apparatus, now obsolete, used by alchemists for distilling.

Alemtejo is the largest prov. in Portugal. It is very mountainous in the E., and is watered by the Tagus, the Guadiana, and the Sado. In the E. there are extensive forests, and the valleys are fertile. In the W. there are large treeless plains where sheep and goats are reared. The other productions include cereals, wine, fruits, and oil. The iron and copper mines are worked but little. The cap. and chief tn. is Evora. Area, 9300 sq. m. Pop. 501,252. *See* Borrow's *Bible in Spain*.

Alençon, a Fr. tn. in the dept. of Orne, and its cap. Its church of Notre Dame—of the fifteenth century—is noteworthy for its architecture, and there are remains of the old castle of A. This tn. is noted also for its '[illegible] 15,000.

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Cape route to India damaged its trade; and its capture by the Turks, 1517, the earthquake of 1822, the plague of 1827, and the cholera of 1832 have added to its ruin. Nevertheless it was recovering from its misfortunes, and before 1914 was still an important commercial centre. During the advance of General Maude against the Turks after the capture of Baghdad in March 1917, A., together with Mosul, became the pivotal positions of the Turks' last lines of resistance. But for the intense heat in Mesopotamia at that time and the occurrence of the Russian Revolution, there is little doubt that General Maude could, in conjunction with the Russians forces, have trapped the whole Turkish army. The town was eventually taken on October 26, 1918, by General Allenby, the Ger. general, Liman von Sanders with the Turkish general staff fleeing to Alexandretta. After the War the town and territory of A. were united with Damascus to form the single territory of Syria under the French Mandate. A. is a centre of the silk industry and tobacco production. The railway from A. to Rayak (200 m.) was opened in 1926. Silk and cotton goods, leather, wheat and other grains, carpets, to-[illegible]

[illegible]

Kémâl-Eddin's *Chron. d'Aleppo* (1097–1146), 1884; A. Russell's *Natural History of Aleppo*, 1756.

Aleshki (formerly Dnieprovsk), a tn. in Taurida, Russia, situated on the Dnieper. It is noted for its fisheries and fruit. Pop. 4960.

Alesia, usually identified with Alise-Ste-Reine, was the scene of Cæsar's victory over Vercingetorix in 52 B.C., which victory completed his conquest of Gaul. From 1862 to 1865 and onwards excavations have been made at Alise-Ste-Reine, and a statue of Vercingetorix stands near that tn.

Alesius, Alexander (1500–65), a Scottish divine, *b.* at Edinburgh and educated at St. Andrews. He contended strongly [illegible] doctrines of the [illegible] martyrdom and [illegible] Hamilton changed his views. He became a strong supporter of the Reformation; he left Scotland and visited Germany, settling down in Wittenberg, where he became a friend of Luther and Melanchthon, and signed the Confession of Augsburg. He visited England and was well received during the reign of Henry VIII., but was driven out by the Six Acts. He again visited England during the reign of Edward VI. He *d.* in Leipzig.

A[illegible] f the prov. of [illegible] It is a fort. [illegible] ading centre. [illegible] the Lombard League as a bulwark against Frederic Barbarossa. The citadel is a very strong fortress, and there is a beautiful cathedral. The manufs. consist of linen and woollen goods and macaroni.

Pop., prov., 840,000; tn., 74,000. Area of prov. 1970 sq. m.

Alessi, Galeazzo (1512–72), an It. architect. He designed many beautiful palaces and churches at Genoa and Milan. Michael Angelo was his close friend.

Alethopteris (Gk. ἀληθής, true, πτέρις, fern), a genus of fossil ferns found chiefly in the coal formation. Sternberg gave it this name, while Brongniart called it Pecopteris.

Aletschhorn is one of the highest peaks in the Bernese Alps, being 13,721 ft. It was first ascended by Tuckett in 1859. The Aletsch, between 12 and 13 m. long, is the largest glacier in Switzerland, and at its E. extremity is the Märjelen Lake.

Aleurone Grains, or proteid grains, are solid granules of proteid substance which act as reserve stores of food for the embryonic plant. They occur in the general protoplasm of the plant, but especially in the seeds. In shape they are round or oval, and they contain mineral matter in the form of a *globoid* of lime and magnesia or a crystal of calcium oxalate. In oily seeds, such as the brazil-nut, there is also a *proteid crystalloid.*

Aleutian Islands, a chain of about 150 is., extending westwards from the peninsula of Alaska towards Kamtchatka, the greater number of which belong to the U.S.A. They were first explored by Russians in 1768, and Captain Cook in 1778 made further explorations. The is. are mostly barren—attempts have been made at cultivation, but with little success. Many of the mt. summits are volcanoes. The largest is. is Unimak, which contains two active volcanoes, and is the nearest to the mainland of Alaska. The only industries are fishing—whale and seal—and hunting. Unalaska is the chief is. for trade. It has a good harbour, parish church, and trading establishments. The exports are fish and furs. The inhab. are of Eskimo origin, and they belong to the Gk. Church. Pop. 1083.

Alewife, the popular name of a Malacopterygious fish belonging to the Clupeidæ, probably so called from a fanciful resemblance to the stout hostess of an ale-house. It is 8–10 in. long, and is common in N. America. It is related to the herring and sprat, and is used for food.

Alexander Archipelago lies in the W. of N. America. It is bounded on the S. by the Dixon Entrance and on the N. by the Cross Straits. Near it are a great number of is.

Alexander, despot of Pheræ, noted for the cruelty and evils of his reign. His cruelties brought about almost constant interventions by the Macedonians or the Thebans. His conduct made continual appeals to the neighbouring peoples by his subjects necessary. He was finally defeated by the Thebans and forced to free the cities of Thessaly. He was murdered by his brother-in-law at the instigation of his own wife.

Alexander, a Jewish prince, son of Aristobulus II. and grandson of Jannæus, was taken captive in Judæa by Cn. Pompeius, but escaped. He was defeated near Jerusalem, 57 B.C., by Marcus Antonius, who had been sent against him by Gabinius, governor of Syria. A., however, conquered Judæa, put many Roms. to death, and besieged the rest in Garizin. At last he was defeated by Gabinius, and beheaded by Metellus Scipio by the order of Pompey, 49 B.C. *See* Josephus, *Antiquities of the Jews,* xiv. c. 5, 6, 7.

Alexander I. of Bulgaria (1857–1893). On April 20, 1879, Prince Alexander of Battenberg was, on the proposal of Russia, elected first sovereign prince of Bulgaria; he was a nephew of the Tsar Alexander II. of Russia. He began to rule a Bulgaria divided between two parties: one of which—the Conservative—was in the hands of Russia; the other had a great antipathy to anything Russian, and was intensely patriotic. In 1881, it being found impossible to rule in such a state of chaos, a change was made in the constitution, and A. became possessed of absolute powers; but these passed immediately into the hands of two Russian ministers. In 1883 the constitution was restored, and in 1885 the union of Bulgaria with East Rumelia took place. This was an infraction of the treaty of Berlin. Bulgaria received some slight support from Great Britain, and was opposed by Russia and Turkey. Then ensued the Serbo-Bulgarian war, which resulted in the following year in the practical recognition of the union. On Aug. 20, 1886, occurred the seizure of A. by a conspiracy of officers and his enforced abdication. His return in a few days was, however, enthusiastically welcomed; but he compromised himself by his telegram to the Tsar, and on 8 Sept. he abdicated.

Alexander I., King of Epirus (336–326 B.C.), was the son of Neoptolemus and brother of Olympias, the mother of Alexander the Great. He went to Italy 332 B.C. to help the Tarentines against the Lucanians and Bruttii, but was defeated and slain in battle near Pandosia on the banks of the Acheron in S. Italy.

Alexander II., King of Epirus, son of Pyrrhus and Lanassa, succeeded his father 272 B.C.

Alexander, King of the Hellenes (1893–1920), second son of King Constantine, on whose dethronement he ascended the throne of Greece, June 14, 1917. His gov., with Venizelos as premier, enjoyed the confidence of the Western Powers. He married in Nov. 1919, Aspasia Manos, an Athenian lady, who bore him one posthumous child—a daughter. During his reign the boundaries of Greece were much extended. He *d.* of blood-poisoning, Oct. 25, 1920, as result of a monkey-bite, at Tatoi.

Alexander I., King of Macedonia (*c.* 505–454 B.C.), was the son of Amyntas I., whom he succeeded. He had to submit to the Persians, and though he secretly favoured the cause of the Gks., he accompanied Xerxes in the invasion of Greece, 480 B.C.

Alexander II., sixteenth King of Macedonia (369–367 B.C.), was the son of Amyntas II., whom he succeeded. He reigned only one year and a few months.

Alexander III., or the Great (356–323 B.C.), was the son of Philip II. of Macedon and his wife Olympias. He



ALEXANDER III.

...s *b.* in the year 356, and received ... education partly at the hands of ...stotle, who seems to have invested ... with a deep and lasting love for ...ner, and partly in the court of his ...er, where the numerous coming ... going of embassies must have ...n his education its practical side. ... was his education in the art of ... neglected, for at the early age of sixteen he quelled a rising that ha... broken out at home in his father... absence. Quarrels occasioned by th... repudiation of his mother and th... marriage of a new wife by Philip I... caused his withdrawal from the court and later his at least open reconcilia... tion with his father. Whether A. wa... involved or not, it was during the period when he was under a cloud and likely to be ousted from his position as heir to the throne of Macedon that Philip fell at the hand of the assassin in 336.

Recognised by the army, he had no difficulty in obtaining his father's throne; although the assassination caused some slight unrest and a tendency in the hill tribes towards revolt, he was in the same year recognised as generalissimo of the army of the Gks. against the Barbarians. Striking at the Barbarians of the N., and crushing a revolt in W. Macedonia, he was forced to strike at Greece, by a revolt of the Thebans. There was no hesitation in the policy he adopted. Thebes had revolted, therefore Thebes must be crushed, and to all intents and purposes Thebes was wiped out of existence. The Gk. alliance against the Barbarians was renewed, no hostility being openly shown.

Early in 334 A. crossed into Asia Minor, to attempt to carry out the great plan of the Gk. federation, the liberation of the Gk. cities from the tyranny of Persia. The defeat of the Persians at the battle of Granicus gave into his hand the headquarters of Persian gov. and almost all the Grecian cities. In most of the cities were established democracies under the supervision of A. and his officers. Only in the tns. held by mercenaries of the Persians did he meet with any resistance. Ephesus and Miletus fell, and Halicarnassus surrendered after a prolonged siege. A. showed clearly, however, that he came not only as a liberator, but as a conqueror. The conquered provs. were placed under the control of Macedonian governors. A. himself received the submission of the Gk. cities of the sea-board, and even the inland uplands were attacked. The attempt to break down the conquests of A. by a naval attack upon Greece failed owing to the death of the Persian admiral (Memnon). A. now determined to attack the Persians in Syria, and passed down on his journey to N. Syria too quickly for interception by the Persian army dispatched by Darius III. In N. Syria, however, he found waiting an army under Darius himself. Slipping past the Persian army, he turned and routed them at Issus, while the Persians were making a vain attack to cut his line of communication. A.

had set himself to conquer the whole of the Persian empire, the negotiations of Darius were useless, A began the detailed conquest of Syria. Tyre, after a seven months' siege, surrendered, and its inhab. were sold into slavery, Gaza met with the same fate, Syria was conquered, the road to Egypt lay open to him.

To the Egyptians A. came as a god, a liberator from an accursed tyranny. Here he met with no resistance, and here he stayed during the winter of 332–331. The city of Alexandria owes its existence to this great conqueror, who founded it at the mouth of the Nile. By his command of the coasts he had broken up almost entirely the naval power of Persia; he was free now to strike at the heart of the Persian empire. Again traversing Syria, he made his final arrangements at Tyre, and then struck straight into the heart of Persia. Near Nineveh he found the army of Darius waiting for him, and here, at the battle of Arbela, he drove before him in complete route the last great army of the Persians. The treasures of the Persian empire were at his disposal, Babylon fell into his hands, the richest provs. were secured. At Susa he seized the treasury of the Persian royal house, an almost fabulous amount of riches. Even the mountain tribes were subdued, and learnt to regard the conqueror of Persia as their conqueror also. Pursuing the defeated king from place to place, A. at last came up with him S. of the Caspian, and here the fallen monarch was assassinated by the small band of followers who still clung to him. A. was still to meet with serious opposition. The crown of the dead king was assumed by Bessus, and A. had to turn back to put down the new revolt. But here also we find the beginning of the Macedonian opposition to A. He was no longer the king of Macedon alone, he had conquered a great empire, he had worshipped at the Egyptian temples, he had worn the dress of a Persian; he was no longer the Gk. captain-general, he was an Oriental despot. The discontent showed itself in conspiracy, which was immediately put down by the execution of the ringleaders.

In 328 Bessus was at last captured and executed, and during the following year A. was busy putting down revolts and planting Gk. colonies. But the quarrel between A. and his Macedonian followers was still apparent, and showed itself in a number of gloomy incidents, amongst which can be numbered the murder of Clitus and the execution of Callisthenes, the nephew of Aristotle. By the end of 327 A. was preparing for his great invasion of India. Meeting with great opposition from the hill tribes, he succeeded in reducing most of their fortresses and reaching the Indus. Already by the time A. reached the Indus it had been bridged, and he immediately led his armies into the Punjaub. Here, trading upon the hostility of rival kings, he easily obtained an ally, and reached the Hydaspes. Here he found King Porus awaiting his arrival, prepared to dispute his passage. Crossing the riv., he engaged Porus in battle, and was successful. Porus fell into his hands, and afterwards became one of his firmest allies. Moving slowly eastwards, A. had just reached the Gate of the Ganges, when the final movement in the Macedonian revolt came; the Macedonian army refused to move further eastwards. After a struggle lasting three days A. gave in and the return westwards began. The gov. of the E. Indus fell into the hands of the native princes, chief amongst whom was Porus; the W. portion of his Indian conquest remained in the hands of Macedonian governors. The Indus to its mouth still remained unexplored, and to this task A. now set himself. In 325 A. at last reached the mouth of the great river, seeing for the first time the ocean.

The return from India was accompanied by great hardships, when the journey did not lie along the sea coast, but had to be undertaken inland. On his return A. applied himself immediately to administrative reorganisation. During his absence many abuses had grown up, many offices were held by incapables; it now remained for A. to set up in proper working order his empire. He attempted to a great extent to fuse the races of Macedonia and Persia, taking to himself Persian wives and inducing his generals and even the rank and file of the army to intermarry with the Persian race. The eyes of the world were all turned upon the greatest conqueror it had known, and A. received embassies from all parts of the known world. Another great enterprise had been planned from Babylonia, fleets had been built, and armies especially trained, when A. developed fever. The disease was not regarded seriously at first, but rapidly became worse, and ten days after the outbreak of the disease the Macedonian army were allowed one by one to pass through the chamber of the dying prince in order to bid him farewell. On the following day he died (323). See Arrian's *Anabasis*; *Quintus*, *Curtius*; and *Life of Alexander*, by Plutarch; Budge, *Life of Alexander*, 1896; *El Libro de*

Alexandro Morel-Fatio, 1906; Maccrindle, *Invasion of India by Alexander*, 1896.

Alexander (1461–1506), King of Poland and Grand Duke of Lithuania. He became Grand Duke of Lithuania in 1492 and King of Poland in 1501. He was practically dependent upon the nobility of Poland because of his lack of money. For this reason he was unable to resist the ravages of the Russians, and it was only with difficulty that he retained the allegiance of Prussia and Moldavia. He was helped, however, to a very great extent by the financial and religious aid given him by the pope, Julius II. He however, did not show any great interest in Poland, his chief interest being in his older dominion Lithuania. He resisted and curbed the growing arrogance of the Teutonic Knights.

Alexander, the name of eight popes; Alexander I. (106–115), Alexander II. (1061–73), Alexander III. (1159–81), Alexander IV. (1254–61), Alexander V. (1409–10), Alexander VI. (1492–1503), Alexander VII. (1655–67), Alexander VIII. (1689–91).

Alexander II. (1061–73) was the nominee of Hildebrande, whose policy he carried out in preparation for the accession of Hildebrande himself (Gregory VII.). He it was who sanctioned the Norman invasion of England and sent the sacred banner to William the Conqueror.

Alexander III. (1159–81) succeeded Adrian IV.; his appointment was opposed by Frederick Barbarossa. Held the third Lateran Council, 1179. Sanctioned Henry II.'s invasion of Ireland, and humbled the same king after the murder of Becket. Spent the latter part of his pontificate in exile, being driven from Rome by the republic.

Alexander VI. (1492–1503) (*Rodrigo Borgia*), *b.* in 1431 in a little Sp. vil. near Valencia, he was by the influence of his uncle, Calixtus III., apidly advanced in the church. He ecame successively bishop, cardinal, nd vice-chancellor, and served in the Rom. court under five popes. During his period he acquired wealth, influence, and position. His two outanding sins were his love for gold d women. In an age when imorality was not regarded as a serious e he called down on himself the nsure of the church. His children his mistresses seem to have ned the basis of his ambition, since them he did all that he possibly ld. By a system of judicious and ntic bribery he became pope on death of Innocent VIII. At first period of power was quiet and factory, but he soon left no doubt his exact policy. A system of nepotism began, which even in an a of nepotism frightened his conte poraries by the lengths to which went. To advance his son, to mak splendid marriage for his daughter, was prepared to spend the wealth the church or to destroy the peace Italy. The secularisation of the churc was carried to unheard-of length The church was to A. merely a mean of carrying out his schemes for th advancement of his family. Even i all the stories of his poisonings and immoralities cannot be accepted, there still remains no doubt but that he was guilty of many. He was a great patron of art, and during his pontificate many treasures of art were done for him. He employed Rafael, Michaelangelo, Pinturicchio, at one period or another. He *d.* on Aug. 18, having dragged down the church to the lowest depths to which even in the Renaissance days she had descended. His most famous, or infamous, children were Giovanni, Duke of Gandia (1474), Cesare (1476), and Lucrezia (1480).

Alexander, the name of three emperors of Russia—Alexander I. (1777–1825), Alexander II (1818–81), Alexander III. (1845–94).

Alexander I., son of Paul I., was *b.* on Dec. 28. His education and early training all combined to form his strange character. No Russian monarch has ever had such weird and contradictory characteristics. He was an autocrat and a liberal at the same time. The freethinking court of Catherine II. made him a freethinker, the teachings of his tutor made him a disciple of the school of Rousseau, his military training gave him full possession of the Russian ideas of autocracy; of such a strange medley was the character of A. formed. Succeeding to the throne in 1801, he proceeded to undo the policy of his predecessor, and renounced the Armed Neutrality of the North. By 1808 he had after a desperate resistance come over to the side of Napoleon. The treaty of Tilsit was a treaty for the division of a world-empire between France and Russia, 'geographical allies.' Almost as rapidly as it had formed A.'s love for Napoleon was shattered, and by 1810 Napoleon had succeeded in deeply offending the pride and the principles of A. The campaign of 1812 completely upset his highstrung and nervous temperament, and henceforward he poses as the peacemaker of Europe, the guardian angel of the European powers. After the coyness of Vienna his great plan was the confederation of Europe, and for this purpose was formed the Holy Alliance. But the action and reaction of Europe after 1815 alarmed him, and

a revolutionary Germany caused him to modify his liberal ideas. Towards the end of his reign he was greatly under the influence of Metternich, and the final act was reached with the Tsar proclaiming himself as the natural defender of the Christian Church in the Ottoman empire. He *d.* sincere in his ideals, a madman to Metternich, a hero to Frederick William.

Alexander II. (1818–81), the eldest son of Nicholas I., was *b.* on April 29. He succeeded to the throne in the middle of the Crimean war, a war which he brought to a close as quickly as national honour would allow. He is famous for his liberal reforms, put forward at a time when the general tendency was that of conservative reaction. He proceeded slowly with his work, but six years after his accession he emancipated the serfs (1861). His reforms were the cause of the rise of two parties, the Conservatives and the Radicals, for whom things were not working rapidly enough. The more extreme Radicals were called Nihilists. His foreign policy raised Russia to a high place in the councils of Europe, and at the same time strengthened her resources. He was assassinated in March, the victim of a Nihilist plot.

Alexander III., second son of the Emperor Alexander II., was *b.* on March 18, 1845. He reversed to a certain extent the liberal policy of his predecessor, and proceeded to rule on autocratic lines. He kept his country at peace, and during his uneventful reign good progress was made. He *d.* in Nov. 1894.

Alexander (three kings of Scotland).

Alexander I. (usually surnamed the Fierce), fourth son of Malcolm Canmore, succeeded his brother Eadgar in Jan. 1107. He ruled over Scotland N. of the Firths of Forth and Clyde, the kingdom of Cumbria being given as an appanage of his younger brother David. He succeeded in establishing firmly the royal authority in the N. During his reign the independence of the Scottish Church was estab. He married Sybille, a natural daughter of Henry I., and *d.* childless in 1124.

Alexander II., son of William the Lion, succeeded to the Scottish throne in 1214. From the time of his accession he was in communication with the still disaffected N. barons, and despite the stipulations in Magna Carta on behalf of the Scots, he joined forces with the barons when hostilities again commenced. He laid siege unsuccessfully to Norham, and the N. barons did homage to him. He retreated before the army sent against him by John, an army which successfully laid waste the border counties of Scotland. This border war continued until 1217. In 1216 A. showed still further his hostility to John by making a special journey to Dover to pay homage for his English possessions to Louis of France. He married the daughter of King John (Joanna) in 1217, and during his reign the definite boundaries of the two kingdoms seem to have been fixed, though no formal frontier was drawn. The usual quarrels during the reign of Henry III. with regard to the homage question resulted in a treaty at Newcastle in 1244, by which Alexander II. pledged himself not to enter into any treaty hostile to his 'liege lord,' Henry III. He *d.* in 1249, and was succeeded by his son, Alexander III.

Alexander III. succeeded in 1249 and ruled until 1286. He was successful in bringing the Western Isles under his power in 1263. The later period of his reign was devoted to administrative reforms, which limited the power of the barons and brought Scotland a period of peace and prosperity, such as that country was not again to enjoy for some time. He was killed in 1286 by falling over the cliffs near Kinghorn, and left as his heiress the Maid of Norway.

Alexander, Obrenovich, King of Servia (1876–1903). Proclaimed king under a regent on abdication of his father, March 1889. Took the gov. into his own hands in 1893. Aroused great opposition by his marriage to Mme. Draga Mashin in 1900. Granted a liberal constitution in 1901 on his own initiative. Murdered together with his queen by military conspirators, June 11.

Alexander I., King of Syria (150–146 B.C.), surnamed Balas. He pretended to be a son of Antiochus IV., Epiphanes, and usurped the throne of Syria from Demetrius I. A war ensued between Balas and Demetrius, in which Demetrius was killed, 152 B.C. Balas was, however, defeated and dethroned by the son of Demetrius, who came to the throne as Demetrius II. Balas fled to Arabia, where he was murdered. *See* Josephus, *Antiquities of the Jews*, xxxiii. 2; 1 Maccabees x.

Alexander II., King of Syria (128–122 B.C.), surnamed Zebina or Zabinas, was sent by Ptolemæus Physcon, King of Egypt, to usurp the throne from Demetrius II. Demetrius was defeated and Zabinas came to the throne. He, however, refusing the annual tribute to Ptolemæus Physcon, was attacked by the Egyptians and defeated. He endeavoured to escape to Greece, but was taken by a pirate and delivered into the hands of Ptolemæus, who put him to death.

See Josephus, *Antiquities of the Jews*, xiii. 9–10.

Alexander, King of Yugoslavia; *b.* Dec. 4, 1888, at Cetinje; second son of Prince Peter Karageorgevich [illegible] 's mother was a [illegible] reigning Prince [illegible] early days were passed at Geneva, where his father lived in exile. The family being favoured by Russia, A. was sent to St. Petersburg in 1899, to be educated. In 1909 he rejoined his father in Serbia, where the latter was now king. A.'s elder brother George having been obliged to renounce his claim to the succession, A. was recognised as heir. He distinguished himself in the Balkan War of 1912; and he was appointed regent by his father, June 24, 1914. He was with the Serbian army in its retreat before the Central Powers; then headed the Serbian Gov. in exile at Corfu, and visited the Western Allies' capitals. He returned to his army; and at the Yugoslav National Council at Zagreb, Dec. 1, 1918, he was appointed regent. His father dying Aug. 16, 1921, A. became king. He married, June 8, 1922, Marie, daughter of King [illegible] nia. On Jan. 6, [illegible] liamentary diffi- [illegible] the constitution, and created a dictatorship.

Alexander Jannæus, the third son of Johannes Hyrcanus, became king of the Jews and high priest 104–79 B.C. He attacked Ptolemais (the present Acre), and burned Gaza. He embraced the party of the Sadducees, with the result that the Pharisees waged war against him, and 50,000 Jews are said to have perished. During his reign he extended his dominions, and *d.* at the siege of Regaba or Ragaba in the ter. of Gerasene beyond the Jordan. *See* Josephus, *Antiquities of the Jews*, xiii. c. 12–15.

Alexander Nevsky (1220–63), Grand Duke of Vladimir, second son of the Grand Duke of Yaroslav. Was ruler at Great Novgorod, and spent the early part of his life in fighting against the Germans and Poles, who were continually endeavouring to winter from Russia, which was just suffering from the great Tatar invasions. His most memorable battle was fought against the Swedes on the banks of the Neva, and resulted in the total rout of the Swedes and the bestowal of the name Nevsky (of the Neva) on the young prince, 1240. He spent the rest of his life in endeavouring to ameliorate the lot of the Russians and relieve the distress occasioned by the Tatar invasion. On his death he was canonised by the Gk. Church.

Alexander Severus, Rom. emperor (A.D. 222–35). He was the son of Gessius Marcianus and Julia Mamæa. About the year 221 he was adopted by his cousin, the Emperor Heliogabalus, and given the title Cæsar. The next year he succeeded to the imperial throne. He was noted for his piety, his virtues, and his justice; he numbered amongst his advisers Paulus and Ulpianus. He was, however, unable to crush the conspiracy which ended in the assassination of Ulpianus. Although a pagan, he held in high regard the doctrines of Christianity, and hated the vulgar ostentation of the Rom. court. He crushed the Persian revolt under Artaxerxes in 232. Two years later he set out for the Rhine, but was assassinated in the neighbourhood of Mainz, a victim to a military conspiracy in 235. His death was mourned by the whole empire, who regarded him as an example of wisdom, piety, and justice, and who admired also the purity of his private life and his lack of vice in an age when vice was regarded almost as virtue.

Alexander of Ægae, a peripatetic philosopher at Rome in the first century A.D., who was tutor to the Emperor Nero.

Alexander of Aphrodisias in Caria, lived at the end of the second century and the beginning of the third century A.D., was a celebrated peripatetic philosopher, and the greatest commentator on Aristotle.

Alexander of Hales, surnamed Doctor Irrefragabilis, a celebrated doctor of theology, *b.* in Gloucestershire, during the thirteenth century. He was trained in the monastery at Hales, where at an early age he became an archdeacon. He studied, as did most students, in the schools of Paris, and became a celebrated teacher there. Suddenly, about 1222, he entered one of the orders of the Franciscan monks, and remained there until his death in 1245. His most celebrated work is *Summa Theologiæ*.

Alexander Polyhistor, an anct. Gk. writer and philosopher of the first century B.C. He was captured and taken prisoner to Rome, where he became tutor to the children of Cornelius Lentulus. By his master he was emancipated. He wrote many books of grammar, philosophy, and history, a few fragments of which remain extant.

Alexander the Ætolian was a Gk. poet who lived at Alexandria in the reign of Ptolemæus Philadelphus (285–247 B.C.).

Alexander, another name for Paris in the *Iliad*. *See* PARIS.

Alexander, Archibald (1772–1851), an American Presbyterian divine. He was born in the county of Virginia,

and educated at a school in Lexington, Virginia, which afterwards developed into the Washington and Lee University. At the beginning of his career he came under the influence of the 'great revival.' In 1791, after being licensed to preach, he became known as a great and eloquent revivalist preacher. He was president of the Hampden-Sidney College (1796–1807), and in the latter year became pastor of a church in Philadelphia. He afterwards became professor in the newly-created Presbyterian Seminary at Princetown, where he remained until his death. He was celebrated also as the author of a number of theological works, amongst which may be mentioned the *Outlines of Moral Science* and a *History of the Israelitish Nation.*

Alexander, Bishop of Lincoln (*d.* 1148). A. was the nephew of Roger, bishop of Salisbury. He became archdeacon of Sarum, and later bishop of Lincoln (1123). Visited Rome in 1125. Took side of Stephen in civil war, although he had sworn allegiance to Maud. Suspected of disloyalty, he was arrested, imprisoned, and dispossessed of his castles. He again visited Rome, and probably crowned Stephen in 1146.

Alexander, Boyd (1873–1910), noted as a British explorer, *b.* at Cranbrook, in Kent. He took part in the famous Alexander-Gosling expedition (1904–1907), which crossed Africa from the Niger to the Nile. It was during this expedition that his brother, Claud A., and his fellow explorer Gosling both lost their lives as a result of the hardships which they had to endure. In 1909 A. began his ill-fated journey. After passing Lake Chad in safety at Wadai, just on the borders of the British sphere of influence in the Soudan, he was attacked by natives and killed.

Alexander, Sir George (1858–1918), actor and theatrical manager, *b.* at Reading in June 1858. He was educated for a city life, but his enthusiasm as an amateur actor soon led him to the stage. He started at the Theatre Royal at Nottingham at the age of twenty-one, and two years later joined Sir Henry Irving at the Lyceum. He played at this and other leading theatres, making his mark as an actor in Faust, 1886, and as Macduff, 1888. He became a manager in 1890 at the Avenue Theatre, and in the following year opened at St. James's. On the stage he could play the lover to perfection, avoiding both bathos and mawkishness. He always took a keen interest in the various societies of the theatre world and held the place of vice-president of the Actors' Benevolent Fund and Actors' Orphanage. He was knighted in 1911, and was a member of the L.C.C. 1907–13.

Alexander, Sir James Edward (1803-85), a celebrated British soldier and traveller. He was *b.* in October, and joined the E. India army in 1820. In 1825 he became an officer in the British army, and was present at the fighting in Persia, and later in the Balkans. He took part in the Kaffir war, being present on that occasion as the aide-de-camp to Sir Benjamin D'Urban. Subsequently he saw service in the Crimea, and again in New Zealand. Amongst other things, to him largely is due the transfer to England of Cleopatra's Needle, 1877.

Alexander, John White (1856–1915), a celebrated American artist, *b.* in Allegheny, Pennsylvania. He pursued his study of art in France and Germany, and became known as one of America's greatest artists. He was president of the National Academy of Design, New York, and a member of a great number of foreign art societies. Amongst his works may be mentioned 'Miss Dorothy Roosevelt,' 'Pandora,' 'Rodin,' 'Walt Whitman,' 'The Quiet Hour,' 'A Ray of Sunlight.'

Alexander, Joseph Addison (1809–60), an American Biblical scholar, *b.* in Philadelphia, Pennsylvania. Was professor of Hebrew at Princeton University and at Princeton Theological Seminary in 1840. In 1859 he was appointed to the chair of Hellenistic and New Testament Theology. He wrote commentaries on books of the Old and New Testaments.

Alexander, Michael Solomon (1799–1845), first Anglican bishop of Jerusalem, *b.* in Germany and brought up in the Jewish faith. He was converted in 1825, and ordained in Dublin in 1827. Worked in Danzig with Society for Promoting Christianity amongst the Jews. Professor of Hebrew at King's College, London, 1832–41, when he became bishop of Jerusalem, and died in Egypt.

Alexander, Samuel, British philosopher; *b.* 1859, at Sydney, N.S.W. Educ. Wesley Coll., Melbourne; Univer. of Melbourne; and Balliol Coll., Oxford. 1st class in classical and in mathematical moderations, 1879; 1st class Lit. Hum., 1881. Scholar of Balliol, 1878. Fellow of Lincoln Coll., 1882–93. Gifford Lecturer, Glasgow, 1916–18. M.A., Hon.LL.D., St. Andrews and Birmingham; Hon.D.Litt., Durham and Liverpool. His philosophy attaches great importance to Awareness; which, though different in kind from its objects, is derived from them—paralleling the results of chemical reactions. A. thus arrives at Emergent Evolution: the emergence of

totally new things from combinations of the old. Space-time, the original matrix, gave birth to matter in varying forms; which in turn gave birth to mind. From mind, God is expected to emerge. (*See* his *Space, Time, and Deity*, Vol. 2, espec. p. 399). Publications: *Moral Order and Progress*, 1889; *Locke*, 1908; *Space, Time, and Deity*, 1920; *Spinoza and Time*, 1921. He received the Order of Merit on the King's birthday, 1930.

Alexander, Sir William (1567–1640), Earl of Stirling. One of the lesser Scottish poets, received grant of Nova Scotia, became later secretary of state for Scotland, a position he continued to hold until his death. Became successively Viscount and Earl of Stirling, and also Earl of Dovan. Amongst his works are *Tragedie of Darius, Aurora, Crœsus,* and *Julius Cæsar*.

Alexander, William (1726–83), *b.* at New York, an American general during the revolution. He was known as Lord Stirling, although his claim to the Stirling estates was stated to be invalid.

Alexander, William (1824–1911), Protestant bishop of Armagh and primate of all Ireland, was *b.* April 13, at Londonderry, and received his education at Tunbridge Grammar School and at Oxford (Brasenose College). He held a number of livings in the N. of Ireland before being made bishop of Derry and Raphoe in 1867. He became primate of all Ireland in 1896. He was the author of a number of theological works, and was also distinguished as the writer of *St. Augustine's Holiday and other Poems*. His wife, Cecile Frances Alexander, is famous as the author of the hymn 'There is a green hill far away' and of numerous other well-known hymns. The primate resigned in 1911, and *d.* in September of the same year.

Alexander, William Lindsay (1808–[illegible]), a Scotch divine. He became recognised as a master of classical erudition. He ed. in 1861 the 3rd. ed. of Kitto's *Biblical Encyclopædia*. From [illegible]77 was principal of Edinburgh Theological Hall.

Alexander Archipelago, a congeries of islands, over a thousand in number, off the coast of Alaska, U.S.A.

Alexander Land, a dist. in the Antarctic, lat. 68° 43′, long. 70–75°, discovered by Bellingshausen, 1821.

Alexandra, a div. of Natal situated between the rivs. Umzimkulu and [illegible]komansi. It has a pop. of about [illegible]00, mainly coloured.

Alexandra Caroline Marie Charlotte [illegible]se Julie, queen of King Edward [VII] of Great Britain and Ireland, was *b.* Dec. 1, 1844. She was the eldest daughter of King Christian IX of Denmark. She was married March 10, 1863, and thence until the death of Queen Victoria in 1901 she was Princess of Wales. Probably the first time she was seen by her (future) husband was at Spires in 1861. The children of the marriage were five, two boys and three girls. The eldest son, Albert Victor, Duke of Clarence, died in 1892, and his brother reigns to-day as George V. A.'s eldest brother became Frederick VIII of Denmark; the second, Prince William, became King 'George' of Greece at the age of eighteen (assass. at Salonika 1913); the third, Valdemar, was an officer in the Danish navy.

Her sister Dagmar married Alexander III of Russia; and Thyra, the youngest, married Ernest Augustus, Duke of Cumberland and titular King of Hanover. A. was much loved in England for her beauty and benevolence; and *d.* at Sandringham Nov. 20, 1925, in the sixteenth year of her widowhood.

Alexandra Feodorovna (1872–1918) (Alix Victoria Helen Louise Beatrice), last Tsarina of Russia, *b.* June 6, 1872, at Darmstadt, youngest child but one of Louis (IV), Grand-Duke of Hesse. Her mother (Alice, daughter of Queen Victoria) dying when A. F. was six, A. F. was brought up partly in England. She married Tsar Nicholas II. (*q.v.*) Nov. 27, 1894. On July 30, 1904, an heir was born: Alexis; whose delicate health occasioned the subjection of A. F. to Rasputin (*q.v.*). During the Great War she influenced Nicholas's policy for the worse. When the empire fell, she shared his captivity. Slaughtered with him at Ekaterinburg (Sverdlovsk) July 16, 1918.

Alexandra Park, a place of recreation in N. London. It contains the A. 'Palace,' and was opened in 1863. The present building was erected in 1873 as the first was destroyed by fire.

Alexandre, Aaron (*c.* 1766–1850), a noted Bavarian chess-player. He visited nearly all the European caps. and was the author of an *Encyclopædia of Chess* and a book of *Chess Problems*.

Alexandresen, Gregory (1812–85), poet of Rumania. He took an active interest in the politics of his country. His poems were collected and pub. under the title of *Original Poems, Elegies, and Fables*. His attack on the gov. and the oppressors of the people brought about his confinement in a monastery, but in spite of the fact he pub. his famous poem entitled *The Year 1840*.

Alexandretta, a tn. in N. Syria. It owes its importance to its proximity to the Beilan Pass. It is the main port for the Aleppo region, and has an extensive trade in tobacco, silk, cereals, liquorice, and textiles. Its climate is insalubrious owing to the marshy ground and the absence of purifying winds. Pop. about 15,000.

Alexandri, Vasilio (1821-90), a Rumanian poet and patriot, *b.* at Jassy. He obtained his education in Paris and subsequently returned to his bp. He threw in his lot with a body of young men of superior education who, aiming at the emulation of western methods of administration, and fired with ambition for literary success, sought political liberty and the freedom of the Rumanian nation. A revolution resulted from their enthusiasm in 1848, but it proved unsuccessful, and Vasilio was compelled to fly to Paris. His activities, however, were unceasing in other directions, the chief being the press. In 1859 and 1860 he was foreign minister under Ghika. He *d.* in Sept. His first poems were pub. in 1852, and his dramas, in an ed. of his complete works, in 1874.

Alexandria, a tn. of Dumbarton, Scotland. It owes its existence to the cotton, bleaching, and printing industries there carried on. Pop. 10,359.

Alexandria: 1. A city of Madison county, Indiana, U.S.A., about 46 m. N.E. of Indianapolis. Its products are chiefly agricultural. The manufacture of glass ware is a very important industry. Pop. 4172. 2. A port and city of Alexandria co., Virginia, U.S.A. It is accessible to the largest vessels, for the riv., which forms its harbour, though 100 m. from the mouth of the Potomac, is fully a mile wide. Pop. 24,149. 3. A city of Rapides Parish, Louisiana, U.S.A. Pop. 23,025.

Alexandria, the chief seaport of Egypt. It was founded in 332 B.C. by Alexander the Great, and was for over 1000 years the cap. of the country. It is situated on a strip of land separating the Mediterranean from Lake Mareotis.

The ancient city.—In anct. times A. was divided into three dists. These contained respectively the Jews, in the N.E.; the Egyptians in the W., a dist. called Rhacotis; and the Gks., who lived in that part of the tn. called Brucheion. This was by far the most beautiful part of the city. Originally the tn. was built upon a mole called Heptastadium, which joined the Isle of Pharos to the mainland. Since then sedimentary deposits have added considerably to the width of the mole. A. was erected after a plan executed by the architect Deinocrates. It was intersected by two broad roads, running at right angles. The buildings in the Brucheion quarter contained the royal palaces of Ptolemies, the Great Theatre, which was afterwards utilised as a fortress by Cæsar during the siege after the battle of Pharsalus, the Poseidon, or the temple to the god of the sea, the Timonium built by Anthony, the Emporium or Exchange, the temple Cesareum, now lying underneath the new sea-wall, the Gymnasium, the Palæstra, the Mausoleum of Alexander, and the Museum and Library. The Necropolis lay to the W. A feature of the tn. was the number of subterranean cisterns running along the spaces under the houses and capable of holding a supply of water sufficient to last the whole pop. a year. At the height of its prosperity it contained, according to Diodorus, approximately 300,000 free citizens, while it is probable that a larger number still represents the number of slaves. The actual development of A., and the very high place it held among the most magnificent cities of the world, were due to the interest and activities of the Ptolemies, who aimed at and succeeded in making it only surpassed in majestic beauty by Rome and Antioch. Placed as it was between the E. and W., it became a centre of commerce, to which position it owed its great commercial supremacy. In 30 B.C., on the death of Cleopatra, the last of the Ptolemies, it fell into the possession of the Roms. It was now at the zenith of its glory. A great centre of Hellenism, at the same time commercially prosperous to an extraordinary degree, and also the fountain of culture and intellect, A. can be said to have held at this time a position of unique and glorious splendour. For a long time it remained in the enviable position as the world's first port. During the reign of Caracalla it sank considerably in its commercial greatness, and the rise of Constantinople only served to hasten its fall. Meanwhile Christianity had been introduced, and quickly had made headway. By the end of the second century it had taken hold of a large number of the people. The subsequent struggle between Christianity and heathenism saw many bloody affrays; but Christianity eventually triumphed, and in 389 the Serapeum, the last seat of heathenism, was captured and used henceforth as a Christian church. The decline of A. was now more rapid. Cairo was chosen by the Egyptian califs to be the cap. of Egypt; the passage round the Cape of Good Hope was discovered together with the finding of

America; such significant events as these proved factors of deleterious influence upon A. Its decay seemed imminent. In 1517 it fell into the hands of the Turks, and presented but a shadow of its former beauty. Those monumental triumphs of majesti ... 'ong the just pr ... 'ere now nearly ... umber of its inh ... surprisingly low number of 6000. Compared with the former pop. of over 600,000 the change is made all the more startling.

Signs of progress, however, were presently visible under Mehemet Ali. Much of its lost ground was recovered, so that to-day, while it may never again present the imposing spectacle it once was, and though the dignity of its learning has faded, yet its commercial prosperity is rising gradually,

...

Suez Canal, ample recompense was found in the consequent advance of Egypt's commerce. In 1882 Arabi Pasha incurred British displeasure by his maltreatment of the Europeans during his rising, and a British fleet was despatched. The bombardment of A. followed, and it is a regrettable fact that of the few remaining emblems of antiquity most were utterly destroyed. This was not all. A few days later the tn. was sacked and a disastrous fire ravaged a large portion of it. Among the scanty objects of antiquity that remain are Pompey's Pillar (so called in error) and two obelisks called Cleopatra's Needles, one of which is on the Thames Embankment, while the other is in New York.

Modern attempts at excavation are rendered difficult, partly by the fact that the present A. is situated right over the site of the old, and partly by the circumstance that much of the old ... , owing to the ...

... partly upon the isthmus which developed from the original mole by means of silt deposits, and partly upon a T-shaped peninsula. The cape to the W. is Ras-ét-Tin, while the E. cape is Pharos or Kait Bey. The Mahmudiya canal, connecting A. with the Nile, runs at the S. of the tn., and by a series of locks enters the harbour. Its climate differs from that of the surrounding country. An almost incessant rain is experienced during the winter, while the summer is rendered temperate by sea breezes. The port was entered in 1927 by 2125 vessels of 4,865,845 tons, of which 605 (1,446,599) flew the British flag. The chief ... rico, ... antiq ... Pillar ... of Ko ... of th ... Antic ... bardr ... peared and the tn. is again quite prosperous. In 1927 the pop. numbered 573,063, of whom 473,548 were Egyptians, the Europeans were chiefly: 37,106 Greeks, 24,280 Italians, 14,394 British, and 9429 French. In the summer the Egyptian government and court and the diplomatic corps move from Cairo to A.

Alexandrian C... the O.T. and N.... British Museum ... vols., large quar ... last vol. It is written on vellum, in double columns, in uncial or capital letters, without spaces between the words, accents, or marks of aspiration. The letters are round and well formed, a few words are abbreviated, and the MS. is in fairly good condition. There has been much contention as to its date, but it is probable that it was about 450. In 1628 it was sent by Cyrillus Lucaris, patriarch of Alexandria and of Constantinople, to Charles I., and was placed in the Royal Library. In 1753 it was transferred with this library to the British Museum. A facsimile of the O.T. was pub. by the Rev. H. Baber of the British Museum (1816–28), and of the N.T. by Dr. Woide (1786), and a second ed. by Spohn.

Alexandrian Library, a collection of books, formed by Ptolemæus, the first king of Egypt; and probably the largest which was made before the invention of printing. It is said to have been founded about 284 B.C., in consequence of the suggestions of Demetrius Phalereus, who had seen the public libraries at Athens. Demetrius was appointed superintendent of the new establishment, and busied himself diligently in collecting literature of all nations, Jewish, Chaldee, Persian, Ethiopian, Egyptian, etc., as well as Gk. and Lat. Eusebius says that at the death of Ptolemæus Philadelphus there were 100,000 vols. in the library. It was situated in the quarter of A. called Brucheion. Philadelphus purchased the library of Aristotle, and it was increased by his successors. Almost all the Ptolemies were patrons of learning; and at last the A. L. is sai ... 700,000 vols. ... spoken of con ... printed volum ... *Metamorphoses* ... books, would r ...

consideration will bring the number of books within the bounds of credibility.

In the siege of Alexandria by Julius Cæsar, a large part of the library was burnt. Gibbon (chap. xxviii.) asserts that the old library was totally consumed, and that the collection from Pergamus, which was presented by Marcus Antonius through Cleopatra, was the foundation of the new one, which continued to increase in size and reputation for four centuries, until, at the destruction of the Serapeum by Theophilus, patriarch of Alexandria, it was dispersed, A.D. 390. Still the library was re-estab.; and Alexandria continued to flourish as one of the chief seats of literature till it was conquered by the Arabs, A.D. 640. The library was then burnt, according to the story generally believed, in consequence of the fanatic decision of the Calif Omar. (*See* OMAR.)

Connected with the library of Brucheion was a college, or retreat for learned men, called the Museum, where they were maintained at the public expense. This establishment was subsequently transferred to the Serapeum, and continued to flourish till the destruction of the temple by Theophilus. The sciences of mathematics, astronomy, and geography were cultivated by Euclid, Apollonius, Eratosthenes, and Ptolemæus the geographer. Criticism, philology, and antiquities were also studied. (Gibbon, *Decline and Fall*, c. 51.)

Alexandrian School and Alexandrian Philosophy. *Alexandrian School.*—When national independence had been lost to the Greeks, the result was that intellectual culture also declined, and it fell to Alexandria, founded by Alexander the Great, to become the centre of literature, science, and philosophy, a position which that city held for nearly a thousand years, from the time of the fall of Greece in the fourth century B.C. to the middle of the seventh century A.D. This period may be divided into two divisions—the first from 323 to 30 B.C., and the second from 30 B.C. to A.D. 640. The first period of this intellectual supremacy was characterised by literature and science; and the second by the speculative philosophy of the Neo-Platonists, and the religious philosophy of the Gnostics and early Christian fathers: so that there were two A. Schools—the Alexandrian School of Literature and Science and the Alexandrian School of Philosophy.

The School of Literature and Science.—Ptolemy Soter, who reigned in Egypt 323–285 B.C., was a great patron of literature and science, and many Greeks of literary eminence gathered around him. With the help of Demetrius Phalereus, an Athenian orator, philosopher, statesman, and poet, he founded the Alexandrian Library. Ptolemy also built the famous Museum, where scholars lived, studied, and taught, and which was conducted on the lines of a modern university. Every facility was given these learned men for their researches. Ptolemy Philadelphus (285–247 B.C.) extended the library by Aristotle's collection of books, and by Jewish and Egyptian works; and it is very probable that during his reign the O.T. was translated into Gk. Ptolemy Euergetes (247–222 B.C.) added works from the archives of Athens to the library The style of the works of the Alexandrian School of men of letters differed very much from that of the ancient Gk. authors, whose writings gave evidence of that perfect freedom which they enjoyed. The members of the Alexandrian School devoted their time to research and criticism, studying grammar, prosody, metre, mythology, antiquities, astronomy, and medicine. The result was that they wrote long epic poems on educational and other subjects. The *Argonautica* of Apollonius Rhodius (*q.v.*) and the *Alexandra* or *Cassandra* of Lycophron are some of the chief examples of the mythical works. Of the didactic epics the chief are: a work of Callimachus, which is lost; Nicander of the Colophon's two medical works, entitled *Theriaca* and *Alexipharmaca;* the *Phænomena* of Aratus, a work on astronomy. Other epic poets were Dionysius, Euphorion, Rhianus, Dicæarchus, and Oppianus. Of the elegiac poets Philetas of Cos, the tutor of Ptolemy Philadelphus, was the earliest; and Callimachus, of whose works only a few hymns, epigrams, and elegies remain, was the greatest. Amongst the lyric poets were Phanocles, Hermesianax, Alexander of Ætolia, and Lycophron. Epigrams were also written by the Alexandrians, and Timon the philosopher was the author of three books of lampoons. Tragedy, too, played an important part, but none of the works of the seven great dramatists who were known as the Alexandrian Pleiades has been preserved. Theocritus was a celebrated bucolic poet, and his *Idylls*, which are pictures of the country life of the ordinary people, greatly influenced Roman poets, especially Virgil. Besides the poets there were the critics and grammarians of the Alexandrian School, who gave to the world the ancient Gk. writings in a form perfectly intelligible, for they devoted their time to criticism, the explanation of words,

and the arrangement of the texts. Amongst these great critics were Zenodotus of Ephesus, Aristophanes of Byzantium, Aristarchus of Samothrace, Alexander of Ætolia, Lycophron, Callimachus, and Eratosthenes. Mathematics, astronomy, geography, and medicine were also treated by the Alexandrian School. Of the Mathematical School Euclid was the founder; and his pupils included Archimedes, whose inventions and discoveries were very important; Apollonius of Perga, the author of a work on conic sections; Hipparchus, the celebrated astronomer, whose catalogue of the stars is preserved by Ptolemy; and Eratosthenes, who wrote on astronomy, geometry, geography, and history.

The School of Philosophy.—The members of this school brought together the philosophies of the East and the West, and the Jewish notions of religion were very much influenced by Gk. ideas. On this subject the reader is advised to consult Philo Judæus. The founder of this Neo-Platonic system (*see* NEO-PLATONISTS) was Plotinus, who was born about A.D. 203, and whose writings his disciple Porphyry rendered in their present form. Another celebrated teacher of this system was Proclus, several of whose works are still extant. The Gnostics (*q.v.*) were a sect who endeavoured to unite Christian and Eastern ideas. Clement of Alexandria and Origen were the two chief representatives. Philo Judæus made attempts to reconcile the Jewish Scriptures with the doctrines of the Platonic philosophy, and several of his works have been handed down to us.

Alexandrina, Lake, a shallow lake n S. Australia, near the mouth of the Iurray River.

Alexandrine Liturgy, known also as e Liturgy of St. Mark, because he is id to have arranged it for the use of ristians in Egypt.

Alexandrine Mosaic, decorative rk said to have been invented by exander Severus, Emperor of Rome). 208–235), and named after him. was employed in the embellishnt of friezes and panels. In the aic are embedded precious stones jewels.

lexandrine Verse, a species of verse h employed by Fr. poets, especi in poetry of the heroic or epic r. Each line in the A. consists of e syllables, and strictly speaking, ollowing the Fr. model, it should vided into two hemistichs, the syllable ending a word. The Alexandrine would appear to be d from an old Fr. poem about nder the Great, written in this towards the end of the twelfth century. Others attribute the nam to Alexandre de Bernay, joint auth of the above. Generally the A. line used in rhymed couplets, and was s employed by Edmund Spenser t finish off each of his stanzas, but it ha also been used by itself alone as the concluding line, and sometimes in the body, of Eng. ten-syllabled verse. Pope railed against it in his well-known couplet:

'A needless Alexandrine ends the song,
That, like a wounded snake, drags its slow length along.'

But for all that he employed it not infrequently. The longest and best poem in our language written wholly in As. is Drayton's *Polyolbion*.

Alexandriya, a tn. in the gov. of Kherson, Russia, situated on the Ingouletz, an affluent of the Dnieper. The dist. is very rich in iron ore. Cattle are reared in the vicinity.

Alexandropol, *see* LENINAKHAN.

Alexandrov, (1) a Russian tn. to the N.E. of Moscow. It was the residence of Ivan the Terrible. Once had large dye-works. Pop. (1920) 5700. (2) A Polish tn. in Piotrkov. Gov. near Lodz. Pop. 6000.

Alexandrovsk: A tn. in N. Russia, in the gov. dept. of Archangel. It is free from ice all the year round, and makes a useful naval station. It bears the name of Port Catherine. Pop. about 400.

Alexandrovsk-Grushevski, a tn. of Russia in the territory Don Cossacks, 27 m. N.E. of Novocherkask, with a pop. of about 13,000. There are coal-mines in the vicinity.

Alexei Michailovitch (1648–76), a Russian Tsar of the house of the Romanoffs. He was the father of Peter the Great, whom he had by his second wife. His reign was harassed in 1648 by an insurrection. He undertook two campaigns against the Poles, and met with considerable success. During his reign he introduced many violently radical changes, both legislative and religious. Nonconformity with the latter gave rise to dissensions. He died in 1676.

Alexei Petrovitch (1690–1718), the eldest son of Peter the Great, *b.* at Moscow. His openly expressed opposition to the reforms introduced by his father, Peter the Great, caused him to be excluded from the line of succession. He entered a monastery, but shortly afterwards escaped. He was sentenced to death, but later was pardoned. The strain of his trial caused his death in prison. His son, Peter II., succeeded Peter the Great.

Alexeieff, Erghenzi Ivanovitch, a Russian naval commander, *b.* in 1843. He was adjutant-general and viceroy

in the Far East (1903), but was recalled. His hard and uncompromising policy was one of the chief factors in bringing about the war between Russia and Japan.

Alexeieff, Michel Vassilievitch (1857–1918), appointed Chief of Staff in 1915 by the Grand Duke Nicholas Nikolaievich. A. extricated all the Northern armies from the Ger. trap then closing upon them, and when Vilna was evacuated (Sept. 1915) he marched them in safety across Russia along the route of Napoleon's invaders in 1812. He was a fine administrator and made great efforts to maintain discipline in the army. In this connection he did effective work in securing more efficient control over raw peasant reserves by the Russian War Office, thereby preventing them from falling in thousands into the hands of the enemy. Amidst all the intrigues of a pro-Ger. court and the wild policy of disloyal demagogues A. stands out as a great Russian patriot and soldier. Though dismissed by the Soviet under Kerensky for his opposition to the 'no annexation, no indemnity' clause in the note to the Allies of the Provisional Russian Gov. of Miliukoff (1917), and replaced by Brussiloff, he was the real brain of the Russian command in staff work, and it was through his remarkable talents as a staff officer that the men under Generals Brussiloff and Ruzsky won a series of brilliant victories against the Austrians, capturing successively positions of great strength at Halicz, Brzehzany, and Tarnopol, storming Lemberg (Sept. 1914), reducing the fortress of Przemysl (March 1915); previously he had traversed the Carpathians to the very gates of Cracow. He was afterwards restored to the chief command, but soon afterwards, when the Soviet became all-powerful, went into retirement to organise the anti-Bolshevik armies, but in October of the same year he *d.* of pneumonia.

Alexeiefka, a tn. of Russia in the gov. of Voronej, near Voronej city. The tn. is situated on the Tikhaia-Sosna, an affluent of the Don. Sunflowers are cultivated in the dist. Pop. about 14,000.

Alexiad, a life of the Byzantine emperor, Alexius Comnenus, written by his daughter, Anna Comnena, and her husband, Nicephorus Bryennius. The work is one of the treasures of the Byzantine collection, and consists of fifteen books written in modern Gk. The substance of the work is the history of the first crusade and the defence of Alexis against the charges of his enemies. From this life Scott drew his material for his novel, *Count Robert of Paris.*

Alexinatz, a tn. of Yugo-Slavia on the Moravitza. In 1876 it was captured by the Turks, and suffered disastrously during the conquest. In 1880 a memorial was raised to the Russians who had lost their lives in its defence. Tobacco is the chief production. Pop. 10,000

Alexis, Willibald, the pseudonym of the Ger. novelist, Georg Wilhelm Heinrich Häring (1798–1871), who was *b.* at Breslau. The work that brought him into prominence is a literary curiosity. It was an historical romance entitled *Walladmor*, and pub. as being a work of Sir Walter Scott. De Quincey trans. the novel into Eng., and Scott himself approved of it. Two more romances were pub. under the same pretence, *Die Geächteten* and *Schloss Avalon*. His other noted works are *Cabanis, Der Falsche Woldemar, Hans Jürgen,* and *Hans Jochem.*

Alexis Angelus, name of Alexis III. (1195–1203) and Alexis IV. (1203–4), Byzantine emperors. Under Alexis III. Constantinople was taken by the Venetian and French crusaders.

Alexius Comnenus (1048–1118), a ruler of the Byzantine empire. He proved himself the most able of these rulers. He was *b.* at Constantinople. His military prowess and the deep affection with which his soldiers regarded him proved valuable influences in his securing the throne, 1081. He was now surrounded by foes innumerable. Scythians, Turks, and Normans attacked from all quarters. Only the shrewdest head could weather the storm, and A. used all his fine qualities. The utmost he could do was a little longer to delay the break-up of the empire. He reigned for thirty-seven years. *See* the various *Histories of the Crusades;* the collection of the *Byzantine Historians;* and particularly the *History* of Anna Comnena.

Alfa, a variety of esparto grass indigenous to N. Africa. It attains a height of 3 to 4 ft., and is used largely in the manuf. of paper. It is sometimes called Halfa.

Alfadir, *i.e.* all-father, a common appellation of Odin in the Scandinavian mythology.

Alfalfa, the Sp. name for *Medicago sativa* or lucerne, called also in England medic, or purple medic, and in the States, Sp. clover, Fr. clover, and Brazilian clover. The plant has a wide distribution in the Old World, and was introduced into America by the Spanish pioneers. It is now grown in the prairie provs. of Canada. The plant is cultivated for forage. It has small purple flowers resembling the flowers of the cultivated pea.

Alfarabi, an Oriental philosopher

who was *b.* at Fareb by the Oxus. He studied at Bagdad and afterwards travelled. Ultimately he settled at Bagdad and lived a life marked by simplicity and retirement. The calif honoured him and gave him a pension. He *d.* in 950. He wrote prodigiously upon nearly every scientific subject known. He is famous as the first writer to attempt an encyclopædia. The MS. of this first encyclopædia is in the Escurial library.

Alfenus Varus, a celebrated Roman jurist, and the author of *Digesta*, was a pupil of the jurist Servius Sulpicius, the friend of Cicero. According to Acron the scholiast (Horace, *Sat.* i. 3, v. 130), he was a shoemaker, was made consul for his great legal knowledge, and had a public funeral, but this has been the subject of much discussion.

Alfieri Vittorio (1749–1803) is among the most eminent of modern It. dramatists; *b.* at Piedmont, his early education was imperfect. The death of his father in his infancy brought about the accession of Vittorio to an enormous fortune. He began equestrian study and riding, and the passion for horses, which is always associated with his name, began at this time. He travelled, but in a furious and practically profitless manner, becoming enamoured more than once of ladies already married. The most famous of these was the wife of Charles Edward Stuart, with whom, after her unhappy husband's d ath, he lived. In order to forget a passionate grief that had been caused by a former love disappointment, Vittorio had taken up literature. Now, so as to honour his latest ideal, the Countess of Albany, Charles' widow, he resolved to perfect his already promising literary talent. His life was ruled by his violent and sudden passions, and it is difficult to find a parallel so impetuous and so furiously impatient with all things. Among his works, which appear to have been inspired more by political emotions than artistic promptings, are the *Abele*, the most successful; *Cleopatra; Fillipe and Polinice; Ottavia; Virginia; Mirra; Agide and Brute*, besides a number of sonnets and *Essays on Literature and Government*. A. gave to Italy the first tragedies that deserve the name, and their influence (at least in his lifetime, and for some period afterwards) was able to hold an It. audience spellbound. His minor works are numerous, both in prose and poetry. His autobiography is a most amusing work.

Alföld, also called Pusztas, a great plain of mid-Hungary stretching from the Danube to the Carpathians. The plain is rich in fruit and pasturage.

Alfonsine Tables, *see* ALPHONSINE TABLES.

Alfonso (the name of five kings of Aragon).

Alfonso I. (1104–34), married the widow of Raymond of Burgundy in order to unite the two great Christian states against the Moors. His violent quarrels with her led to civil war. He gained the title of 'the Battler' from his great battles with the Moors.

Alfonso II. (1162–96) adopted this name in order to please the Aragonese. He was ruler of Aragon and ter. in S.E. France. Held Leon in the work of reconquest.

Alfonso III. (1285–91), a weak king who could not hold his nobles in check.

Alfonso IV. (1327–36), a weak king whose reign is colourless.

Alfonso V., the Magnanimous (1416–58), King of Aragon, Sicily, and Naples. A patron of men of letters and one of the conspicuous figures in the Renaissance. Had a great liking for the classics, and his court was the recognised centre for wandering scholars.

Alfonso (name of eleven kings of Leon and Castile). Of the first two kings of this name very little is known. They ruled between the years 740 and 840. To the first the title of 'the Catholic' was given; to the second, his grandson, the name 'the Chaste.' Later legend purports to tell us much more than we can gather from contemporary or reputable records.

Of the next three As. we are also able to gather very little, but during their period (866–1028) we get the beginning of organised resistance to the Moorish invaders, and also the beginning of an organised Aragon. Especially can this be noted of Alfonso V. (999–1028).

Alfonso VI. (1065–1109), a leader of organised resistance to the Moors. He brought Spain nearer the papacy, and endeavoured, by spreading Fr. influence, to civilise Spain.

Alfonso VII. (1126–57), 'the king of the men of two religions.' He strove after the unity of Spain and protected the Moors. He was killed in trying to check a Moorish rising.

Alfonso VIII. (1158–1214), King of Castile and leader of the Christian coalition that broke the power of the Moors. He married a daughter of Henry II. of England.

Alfonso IX. (1188–1230), King of Leon. The only important feature of his reign is the quarrels which his marriage brought him into with the pope.

Alfonso X. (1252–84), 'El Sabio' (the Wise), a learned king, who gave great encouragement to the study of

astronomy. His policy, however, led to frequent quarrels with his nobles, and his attempt to obtain the empire led to much severe and unpopular taxation.

Alfonso XI. (1312–50), the Avenger, is noted chiefly for the severe manner in which he repressed his rebellious nobles, and for the defeat of the last Moorish invasion from Africa.

Alfonso (name of six kings of Portugal).

Alfonso I. (1112–85) succeeded in establishing the independence of Portugal, which up to this time was a dependency of Leon. A great warrior and a man of gigantic stature, he distinguished himself in many battles against the Moors.

Alfonso II. (1211–23), noted chiefly for his endeavours to weaken the power of the clergy, for which he was excommunicated, and for the code of laws which he introduced.

Alfonso III. (1248–79). His reign was taken up principally in fighting the Moors.

Alfonso IV. (1325–57). Wars with Castile and the Moors occupied most of his reign. Civil war broke out between himself and his son Peter as a result of the barbarous murder of Inez de Castro (Peter's wife).

Alfonso V. (1438–81), usually called 'Africano,' a name which he gained for himself by invading the territories of the Moors in Africa.

Alfonso VI. (1656–67). Forced by his vices to abdicate in 1667, he retired to Terceira, where he *d.* in 1675.

Alfonso XII. (1875–85) was *b.* Nov. 28, 1857. In 1868 he accompanied his mother into exile, and in 1870 she abdicated in his favour. While continuing his education at Sandhurst in 1874 he issued a manifesto proclaiming himself the only representative of the Spanish monarchy. In the following year he entered Spain, being received everywhere with enthusiasm. He married his cousin, the Princess Maria de las Mercedes, and on her death an Austrian princess, Maria Christina. He *d.* of phthisis in Nov. 1885, having shown himself in his short reign to be a tactful and fearless sovereign.

Alfonso XIII., King of Spain, son of Alfonso XII., *b.* posthumously, May 17, 1886. His mother, Queen Maria Christina, formerly an Austrian archduchess, acted as regent during his minority. He assumed control of the gov. in 1902. In 1906 he married Princess Victoria Eugenie of Battenberg, niece of Edward VII., and narrowly escaped assassination on the day of his marriage. An heir to the throne, named Alfonso, was *b.* in May 1907. There are three other sons and two daughters. During A.'s minority, Spain lost its colonial empire as a result of war with the United States. Later features were: its neutrality during the Great War, and



[*Topical Press*

KING ALFONSO XIII.

its campaign in Morocco—which created trouble at home that led to the suspension of the Constitution in 1923. Though his assassination has been attempted several times, A. is not personally unpopular; being brave, frank, and impulsive.

Alford, a vil. in Aberdeenshire where the Covenanters were defeated by Montrose, 1645.

Alford, a mrkt. tn. 22 m. N.E. of Boston, Lincolnshire; pop. 2500.

Alford, Dean Henry (1810–71), Eng. divine and scholar. He showed early promise of extraordinary abilities, for at the age of ten he had written sev. Lat. odes and a history of the Jews. He entered Cambridge in 1829. Shortly afterwards he issued his first volume, entitled *Poems and Poetical Fragments.* His most well-known book, *The School of the Heart and other Poems*, followed. In 1841 he became vicar of Wymeswold in Leicester. His scholarly and erudite *Chapters on the Greek Poets* now appeared. In 1857 he was ordained dean of Canterbury. Among the many hymns he wrote is 'Come, ye thankful people, come.'

Alfort, situated between the Marne and the Seine, is noted for its veterin-

ary college founded by Bourgelat, 1766.

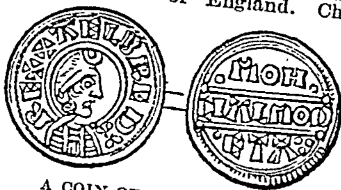
Alfraganius, or **Al-farghani**, an Arabian astronomer who flourished in the early part of the ninth century. He was the first among the Arabian astronomers to enumerate the small stellar groups, and he wrote a treatise on the elements of astronomy.

Alfred the Great (871–900) was *b.* at Wantage, in Berkshire; the exact date of his birth is not known, and authorities differ between the years 843 and 849. The generally accepted date, however, is the year 849. In 853 and in 855 he was taken to Rome, where, on his first pilgrimage, he was hallowed by the pope, Leo IV. Even prior to his accession to the throne he was in continual conflict with the Danes, and he assisted his brother Ethelred right down to his death. He



KING ALFRED'S JEWEL

vas the youngest son of Ethelwulf, nd succeeded on the death of his lder brother. The first few years f his reign were constantly occu- ed in fighting the Danes under their eat leader Guthrun. For seven ears A. fought, bargained, and eated with the Danes in a vain deavour to give the wearied coun- - a rest from the constant war and odshed which she had endured. 878 A. was driven into the woods l swamps of Somerset, and re- ned in hiding at Athelney until he nd himself strong enough to burst h upon the Danes. At the battle Edington in Wiltshire in 878, he rly defeated the Danish invaders . an obstinate and prolonged ggle, driving them back to their fortifications at Chippingham. short siege followed, at the end which the treaty usually known a the Treaty of Wedmore was signe 878. The Danes became Christian the country was divided up, N. an E. of a line drawn roughly fron Chester to London became the Dane lagh, S. and W. remained Wessex The victory at Edington arrested the flowing tide of Danish conquest and brought nearer a united England. For the greater part of the rest of his reign A. was able to attend to the crying needs of the country. The army was reorganised, a navy recognised as an absolute necessity, justice was reformed, education received attention. By means of his navy A. was able to attack the Danes on the sea and in their strongholds, but this policy of a strong navy was not followed closely enough by his successors. To his court A. invited learned men from all parts of Europe, men whose learning would be of use to him in his great scheme for the education of the people of England. Chief



A COIN OF KING ALFRED

amongst these men we may mention Asser, Werfrith, and Plegmund. From his reign dates the beginning of Eng. prose writings, to which he by his own toil and the work of his school added not a little. The epitome of Orosius, *The Consolation* of Boethius, the *Pastoral* of Gregory, and Bede's *Ecclesiastical History* are all translations by A. himself. He issued also a code of laws, compiled on the lines of the code of Ina and Offa. The latter part of his reign was again taken up in fighting the Danes under Hasten, and desultory fighting seems to have taken place right up to his death in the year 900. *See* Stubbs, *Alfred the Great*, 1901.

Alfred, (1) a vil. in Alleghany co., New York, U.S.A. On Pine Hill is A. University, associated with which is the New York State School of Clay-Working and Ceramics. There is now also a State School of Agric. in connection with the university. (2) A co. S. Australia on the E. border, bounded on the N. by the Murray river.

Alfred, Ernest Albert, Duke of Saxe-Coburg and Gotha, and Duke of Edinburgh (1844–1900), was the second son of Queen Victoria. On the de-

position of Otho he was unanimously invited by the Greeks to become their king, but political difficulties of long standing rendered it impossible. Was rear-admiral in 1878, and commander-in-chief at Devonport (1890-93). He succeeded to the duchy of Saxe-Coburg and Gotha in 1893.

Alfreton, a tn. in Derbyshire noted as a market centre. It manufs. hats, stockings, and brown earthenware. Pop. 20,472.

Alfuras, or **Harafuras**, the aboriginal inhab: of Celebes, but inhabiting also Buru, Ceram, and New Guinea, and said to be of Malay extraction.

Algæ (Lat. *alga*, seaweed), with the fungi, form the large group of the vegetable kingdom known as the Thallophyta; they have many characteristics in common, and the lichens are a curious link between them, as they are partly algal and partly fungoid in construction. While, however, A. possess chlorophyll—sometimes masked by other colours—the fungi are devoid of this pigment. According to the colouring matter they contain, the A. are divided into green A. or Chlorophyceæ, brown A. or Phæophyceæ, red A. or Rhodophyceæ (sometimes Florideæ), blue-green A. or Cyanophyceæ.

Plants in this group reproduce either sexually or asexually, in the latter case frequently by means of ciliated spores which are able to move in the water. In the sexual reproduction the gametes sometimes unite in isogamous conjugation, *i.e.* with similar gametes; but others have heterogamous conjugation, when a male unites with a female gamete to form the new plant.

The *Pleurococcus* is a well-known green alga which occurs as a unicellular plant on damp wood. It multiplies by cell-division, and often many cells will be found together; it also reproduces by biciliate spores and isogamously. *Spirogyra* is usually found in slimy masses in ponds and lakes, each plant consisting of sev. cells united to form a filament, each cell being complete in itself and the filament having no attachment and showing no distinction of base and apex. Such a filamentous alga was said, in the time of Linnæus, to belong to the genus Confervæ, or jointed A., but this is too wide a name for present-day discoveries. The spirogyra conjugates in an isogamous manner: two neighbouring filaments send out processes from their cells which fuse on meeting, and form a tube through which the contents of one cell, contracted into a gamete, pass over into the other cell and there unite with a similar gamete. The *Œdogonium* is a filamentous green alga which grows attached to stones in ponds. It reproduces by means of a multiciliate spore which moves in the water and finally attaches itself to a stone and forms another filament, or it reproduces sexually by means of an oögonium and antheridium. These two sexual organs may occur on the same filament, or one kind may be peculiar to a single filament. The antheridium, which is formed by cell-division, produces two spermatozoids which have a large nucleus and many cilia. The oögonium forms a rounded protoplasmic ovum, and the spermatozoid swims down a passage to the ovum; the resulting oöspore gives rise usually to four zoospores with cilia, and these break free, swim about, and finally form a new plant.

From the three examples of the Chlorophyceæ given above it will be seen that the green A. vary greatly both in structure and as regards their reproductive processes. Other well-known types, such as the *Ulothrix* found in running water, the *Vaucheria* common to damp earth and the soil of potted ferns and other plants, and the *Chlamydomonas* found in ditches and ponds, show different structures again. The Phæophyceæ and Rhodophyceæ consist nearly entirely of seaweeds (*q.v.*), and the Cyanophyceæ is regarded as a doubtful alga.

The *Cyanophyceæ* consist of very simple plants growing in both fresh and sea water. Neither nucleus nor sexual reproduction has been observed in connection with it. They reproduce by means of spores or by div. of a filament at a cell called a *heterocyst*, *i.e.* a large cell which contains food material. *See* D. H. Scott's *Structural Botany*, part ii., 1907; F. Wolle's *Freshwater Algæ*, 1887.

Algæ, Fossil, are not very common, owing to the destructible nature of the living plants; frequently, also, comparison is impossible owing to their lack of similarity with plants of the present day. Traces of sev. genera occur in Silurian, carboniferous, liassic, oolitic, and later deposits.

Algardi, Alessandro (1602-54), an It. sculptor and architect, was a pupil of Giulio Cesare Conventi. He first worked in Mantua, but afterwards went to Rome, where he executed two statues in stucco for the Capella Bondini in the church of San Silvestro. His principal works are: the colossal group in marble, representing the decapitation of Saint Paul, for the church of the Padri Bernabiti at Bologna; the monument of Leo XI., and 'Attila checked by Saint Leo,' in St. Peter's; and the bronze statue of Innocent X.

Algaroba, otherwise known as

Carob, a locust-tree, and as the Mesquite tree. It forms a large part of the food of the poor. The seeds were once used as jeweller's weights.

Algarotti, Francesco, Count (1712-64), an It. philosopher and writer on art. He was educated at Rome and Bologna. He became acquainted with Voltaire at Paris, and the relationship assumed a long friendship. He now produced in Paris *Newtonianismo per le donne*, a work on optics. In 1740 he was made Count of Prussia by Frederick the Great.

Algarvé, the smallest and most southerly prov. of Portugal. Till 1253 it was in the possession of the Moors. Its area is 1937 sq. m.; its pop. (in 1900) 255,191. Fruit and wine are abundantly produced. The chief industries of the people are fishing and salt-making. Faro is the chief town.

Algebra, a system of mathematical calculations where quantities are designated by symbols, usually letters of the alphabet. In ordinary A. the same operations are carried on as in arithmetic, but the symbols being capable of a more generalised and extended meaning than the figures used in arithmetic, it facilitates calculation where the numerical values are not known, or are inconveniently large or small, or where it is desirable to keep them in an analysed form. Addition is denoted by + and subtraction by −; $a + b$ and $a - b$ therefore indicate the addition and subtraction respectively of the quantities represented by a and b. The results may enter into subsequent calculations as $(a + b)$ and $(a - b)$. Multiplication is denoted by ×, or by putting the symbols together, thus $a \times b = ab$; division is denoted by ÷ or the use of the fractional form, thus $a \div b = \frac{a}{b}$. Involution, or the multiplication of the same quantity, is shown by the use of small numbers, or indices; thus $aaaa = a^4$. Therefore $a^4 \times a^3 = a^7$; $a^5 \div a^7 = \frac{1}{a^2}$ or a^{-2}. Evolution is denoted by the use of radical signs or of fractional indices; [illegible] or $a^{\frac{1}{2}}$. [illegible] monly [illegible] Thus if the value of a symbol be represented by the distance in a given direction of a point from a fixed point, the corresponding negative symbol represents an equal extension in the opposite direction. Unreal quantities, such as the square root of a negative quantity, can also be symbolised and used in A. Thus $\sqrt{-7} = -7^{\frac{1}{2}}$.

A. was probably known in a rudimentary form to the anct. Egyptians, but the earliest western work on the subject was written by Diophantus of Alexandria about A.D. 350. The Hindus had developed A., however, to a point far beyond the achievements of Diophantus. From them the Arabs brought the system to the west, and Mohammed ben Musa, c. A.D. 820, wrote a work entitled *Al-jebr wa'l-muqābala*, from which the word 'algebra' has been derived. In 1202, an It. merchant, Leonardo of Pisa, reintroduced the study of A. into Europe, where it had declined since the fall of the Roman empire. The solution of cubic equations and biquadratic equations was accomplished by the sixteenth century, and in the seventeenth Franciscus Vieta used symbols for known quantities as well as unknown, and introduced such terms as *affirmative, negative,* and *coefficient*. Descartes, the famous Fr. philosopher, connected A. with geometry in 1637, and did much to extend the theory of equations. Since his time progress has been constant. Among many who have developed A. and allied systems may be mentioned Newton, Euler, Lagrange, Peacock, Sylvester, and Cayley.

Algeciras, a Spanish tn. in the prov. of Cadiz, situated on the Bay of Gibraltar. Charcoal and tanned leather are extensively produced. The tn. is noted for its oranges and bullfights, but is chiefly memorable for the Conference of the Powers held there in 1906. This arose out of the unsettled state of Morocco, due to the deposition of Abdul Aziz by his brother, Muley Hafid, who succeeded him as sultan. In the agreement of Algeciras, signed on April 7, the Powers entrusted France and Spain with the duty of creating a gendarmerie and pacifying the country. The Agadir incident, which during 1911 taxed the resources of European diplomacy, arose from what was alleged to be a practical repudiation by Germany of the Algeciras agreement. Pop. about 1300.

Alger, Russell Alexander (1836-1907), American soldier and politician, *b.* in Medina co., Ohio. Practised law in Cleveland, Ohio. At the outbreak of the civil war he enlisted in a cavalry regiment and was distinguished in the Gettysburg campaign. After the war he developed a lumber business and accumulated a large fortune. He was Secretary of War under McKinley, and his administration during the Spanish-American War was criticised on account of inefficiency and extravagance; he replied in his book, *The Spanish-American War* (1901). Was elected Senator 1903.

Algeria, a country of N. Africa and a Fr. possession. Its boundaries are, on the N. the Mediterranean, on the W. Morocco, on the S. the Sahara, and on the E. Tunis. The former political divs. of the country were three, Oran on the W., Algiers in the centre, and Constantine in the E. but the colony of A. is now organised in two great divisions, Northern A., 80,000 sq. m. in area, and Southern A., 767,000 sq. m. Northern A. comprises Civil Territory and the Territoire de Commandement, but the latter is rapidly becoming merged in the former. It contains seventeen arron. 276 communes and seventy-six mixed communes in the Civil Territory and two mixed communes in the military territory. In Southern A. are the four territories of Ain-Sefra, Ghardaia, Tuggurt, and the Sahara oases, organised under a decree of 1905. By a law passed in 1919 the status of French citizens was given to natives over twenty-five years of age and monogamous, who are farmers or property owners, or who are not illiterate or who served in the World War. The area is 184,474 sq. m.

The physical features of A. divide the country into three divs., viz. in the N. the Tell, consisting of mt. masses divided here and there by deep and fertile valleys; in the middle a region of steppes, a mountainous table-land broken at intervals by brackish lakes, called shotts; in the S. is the Algerian Sahara. The Tell contains the following mt. chains, collectively called the Coast Mts., but separately comprising the Blidah, Jurjura, and Little Khedija. Parallel to these are the Middle Atlas Mts. The Tell is the most populous region and is on the average 47 m. broad. The steppes, or middle region, possesses the largest streams, which empty themselves in the Mediterranean, through gaps in the Coast Mts. They are of no available value, being choked and considerably diminished in size during the summer. In irrigation, however, they are of more value.

The climate of A. is generally warm, though the varying altitudes cause a wide range of temp. The coast enjoys a very mild climate. The rainy season is prolonged over a period extending from December to March. From May to October a hot, dry climate is experienced, rendered very extreme by the sirocco, a wind that proves a great affliction, both on account of its great heat and of the fine sand it carries. During the day the temp. is very different from that felt at night. Generally the climate is healthy, and many improvements in the shape of irrigation, the draining of Lake Hallula, and the planting of forests conduce to more salubrious conditions than naturally would be found.

Agriculture is an important activity and there are several agricultural banks supported partly by Government funds. The greater part of the State lands have now been appropriated to colonists, the chief crops raised being wheat, especially in Tell, and most of the ordinary cereals and root crops. In the centre of the country, or the old province of Algiers, fruit and vegetables are cultivated extensively, and tobacco, flax, and cotton are also important products. Sericulture, which is subsidised by the Government, is in an experimental stage. The chief fruits are orange, lemon, date, banana, almond, olive, fig, pomegranate, and all are grown in abundance, largely on account of the boring of artesian wells, which has made it easy for fruit-bearing trees to flourish. The grape is also cultivated, and the wine yield is now nearly 200,000,000 gallons a year. There is a fair amount of timber from the State forests for industrial purposes. These forests contain pine, oak, cedar, pistachio, carob, olive, and myrtle trees. Cork and esparto grass are among the most important exports. In the steppes inexhaustible supplies of alfa are grown. Little of the mineral wealth is worked, but there is evidence that iron and copper exist.

The population is about 6,065,000, of whom 5,200,000 are natives. Of the native inhab. the chief are Arabs and Berbers, the former being found chiefly in the S., while the latter inhabit the dist. of Tell. A number of Moors, though not pure, are found on the coast. In the towns negroes, originally slaves, fill the menial positions of labourers and servants. The natives are entirely Mussulman, but Islam is found in its purity only among the Arabs. The Jews are now regarded as Fr. citizens, and their rabbis, like the Protestant pastors, receive government grants. The Roman Catholic Church has an archbishop and two bishops. There is a university at Algiers attended by some 1700 students, and besides the usual faculties, there are special schools for the fine arts, commerce and agriculture. Some 50,000 native children attend the 550 Mussulman schools, and there are also higher Mussulman schools in the three chief towns, besides a system of primary and secondary schools. The military force in A. and Tunis comprises the 19th Army area of three divisions. Both Fr. residents and natives are

obliged to serve; and the troops may be stationed in N. Africa or sent on Colonial expeditions, but they belong to the 'Metropolitan,' and not to the 'Colonial' Army. The strength of the army in A. and Tunis is approximately 71,000.

Animal life in A. contains, among domestic animals, camels and sheep, horses and mules. Sheep form the chief wealth of the Arabs. Wild animals are leopards, few, however, in number, jackals, hyenas, Algerian apes, boars, brown bears, and the red deer. Periodic visits of locusts are responsible for great damage.

Algiers is the cap. and prin. port. Oran is the cap. of the dist. of that name and a flourishing seaport. The inland cap. of Constantine is a tn. of the same name. Other ports are Bona, Mostaganem, Philippeville, Bougie, Cherchel, La Culle. The inland tns. are Tlemçen, Biskra, El Wad, Tuggurt, and Wargla. Commerce is confined to Fr. vessels. There is a large coasting trade. The chief exports are those of oxen, sheep, and horses. Communication exists by rail between the frontiers of Morocco and Tunis, and between Algiers, Oran, and Constantine by branch lines, in the same system being many of the smaller tns. There is a regular air service between Oran and Morocco, and between Oran and Alicante in Spain.

From 1876, A., formerly under military despotism, became governed by a civil governor-general. The post was ornamental till 1900, when direct authority over customs and smaller matters was vested in his person. To-day all the services are under his administration, with the exception of those of the Treasury, Education, Justice, and Worship, which are under their respective ministries in Paris. The budget, which is prepared by the Governor-General, is entirely separate from the Fr. national budget. The Gover[illegible] a Superior [illegible] and high [illegible] paring the budget, and, in the exercise of his other functions, by an advisory council of government. At present there is a proposal under consideration to set up a Consultative Committee in Paris on the model of the British Council in India. The whole legislation is conducted in the Fr. chambers, but such subjects as are not within this power are regulated by decree of the President of the Republic.

History.—In early times the inhab. of A. comprised the Numidians in the E., and the Moors in the W. Under the Romans the cities of the W. formed practically colonies of Rome. About A.D. 440 the Vandals conquered A., and relapse into a condition of barbarity followed. Social advancement found impetus in the immigration of Mohammedans. Algiers was built *c.* 935 by an Arab prince named Zeiri, whose family held control of A. till 1148. The Almouhades then took possession of it. In 1269 it was broken up into a number of small territories. There settled in A. in 1492 the Moors and Jews who had been expelled from Spain. In order to seek revenge, piracy was adopted and extensively followed. The Sp. monarch Ferdinand punished them by taking Algiers in 1509. At this time a prince of A. sought the aid of a famous Turkish pirate named Horuk Barbarossa. At this point Turkish power in A. may be said to have begun, for, with the treachery necessary to his trade, Barbarossa slew the amir whom he had come to help, and massacring his followers, estab. himself sultan of A. A period of success attended him, but finally he was taken and beheaded. The [illegible] en given to his [illegible] the protection of [illegible] and with the aid [illegible], drove out the [illegible] a military abso[illegible]. Various expe[illegible] Eng., Dutch, Fr., Spaniards, and Americans successively, failed to check piracy till 1830, when Algiers was bombarded into submission by a Fr. fleet. General Clausel now endeavoured to establish order. A fierce and intrepid opponent rose in the person of Abd-el-Kader, who organised a holy war to such advantage that the Fr. general was forced to send for reinforcements. Clausel's successor, Damrémont, severely punished the Kabyles, a branch of the Berbers, and a different state of things now prevailed. Constantine was subdued and a governor-general appointed. In 1847 Abd-el-Kader surrendered. A series of insurrections of the Kabyles gave the Fr. considerable troubl[illegible] restored. [illegible] Prussian W[illegible] withdraw most of the troops from A., and the opportunity was seized to revolt against the military despotism then in vogue. Since 1883, however, order has been preserved and the natives have maintained a friendly attitude. Attempts to establish rail communication to Senegal have met with more success, and so far endeavours to connect similarly A. and the Soudan have prospered. See Harris, G. W., *Pract. Guide*, 1893.

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[*Canadian Pacific.*

A STREET IN ALGIERS

Algoma, an extensive dist. in the prov. of Ontario in the dominion of Canada on the N. shore of Lake Huron. The ter. has great mineral wealth, being rich in silver and copper. The Canadian Pacific Railway passes through the dist.

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[*Canadian Pacific.*

A STREET IN ALGIERS

ozoic system. In the region of Lake Superior these rocks, consisting of quartz, limestone, sandstone, etc., contain very valuable iron and copper deposits. (2) Stock, a group of N. American Indians embracing more tribes than any other group. In the group originally there were various tribal confederacies, though no real union of the tribes of the entire group existed. The As. were the first N. American Indians to come in contact with the Eng., but now they have been pushed westward and have been reduced by disease and oppression.

Algonquins, the name given to various tribes of N. American Indians that dwelt round the basin of the St. Lawrence in the seventeenth century. Among their different subdivisions are Abenakis, Micmacs, Delawares, Mohegans, *Crees*. The term is now used regarding the Indian inhab. of Quebec.

Alguazil, a Sp. title conferred upon judges in former times. The pure function of it has been lost, however, and any offi[illegible]
execution of [illegible]
See *Gil Blas* [illegible]
Borrow's *Bib*[illegible]
151).

Algum, the trees mentioned in the Bible in 2 Chron. ii. 8 and 1 Kings x. 11. They were brought from Lebanon for the building of Solomon's temple, but they cannot be identified with any degree of certainty.

Alhagi, the name of a class of trees from which manna exudes.

Alhakim I., Emir of Cordova (796–822), drove the Franks beyond the Pyrenees. **A. II.**, Calif of Cordova (961–976), won many victories over the Christians, [illegible] extended the in-
[illegible] ammedan creed.
[illegible] as excellent, and
[illegible] arning flourished.
[illegible] which contained
000,000 vols. and afterwards became the famous Academy of Cordova.

Al-Hakim-ibn-Otto, fl. *c.* 760, an impostor who came as a prophet to Merv, the cap. of Khorassan. He always uttered his prophecies from under a veil, and was called Al Mokanna—the Veiled One. Moore has immortalised him in his poem *Mokanna, or the Veiled Prophet of Khorassan*.

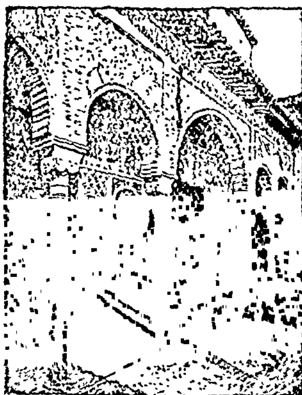
Alhama, a tn. of S. Spain in the region of Granada. It derives its name from the baths which form to-day one of the few remaining monuments of antiquity. Byron translated a ballad which describes the fall of the town, entitled *Ay de mi, Alhama*.

Alhambra, an anct. fortress and palace of the Moorish monarchs of Granada. The name is derived from Kal' at-al-hamra, meaning 'the red castle,' because of the colour of the bricks of which the walls were composed. It is surrounded by a massive wall, strengthened here and there by



GATE OF JUSTICE

lofty towers. Of these, that called the Hall of the Ambassadors is the most famous. It was built during the years between 1248 and 1354, and although most of the artists are unknown, the painting of the interior has been traced to Yusef I. The



GALLERY IN THE COURT OF THE FISH POND

building is situated in a position of rare natural beauty. The most striking feature is a park of English elms, brought there by Wellington in 1812. Scattered over most of the buildings is a species of lace-work which, when closely observed, bears, intricately worked into its design, translations

from the Koran, besides specimens of Arabic poetry. *See* Calvert's *Granada Present and Bygone*, 1908.

Alhambra, tn. in Los Angeles co., California, U.S.A. It stands at the entrance to the San Gabriel Valley and is virtually a residential suburb of Los Angeles. Near its tn. limits are the remains of the famous San Gabriel Mission founded in 1771. Pop. 29,551.

Alhaurin-el-grande, a tn. of Spain in the prov. of Malaga. It has sulphur baths and marble quarries. Pop. about 8000.

Alhazen, an Arabian mathematician of the eleventh century. He was *b.* at Basra, and *d.* in Cairo in 1038. In order to avoid a task the ease of which he had boasted to the hakim, he feigned madness till that monarch's death. He is regarded as an authority upon optics.

Ali, or Ali-Ben-Abu-Talib (600–61), the fourth of Mohammed's successors. Born at Mecca in 600, he married his cousin Fatima, daughter of Mohammed. In 650 he was made calif. The young widow of Mohammed, however, rebelled, but the insurrection was crushed. In 661 A. was assassinated. His rule is noticeable in that two parties were formed in the state, a result which arose from the different supporters of the struggling parties in the rebellion. They were Shiites and Sunnites respectively. A. is looked upon as having possessed a reputation for wisdom. A. had by Fatima three sons, Hassan, Hossein, and Mohsen. Hassan succeeded his father for a short time in the gov., and with him terminated, according to the Arabic historians, the legitimate califate, *i.e.* the succession of those califs who had been appointed by the free choice of the faithful.

Ali, Hyder, *see* HYDER ALI.

Ali Baba, the hero of a story in the *Arabian Nights Tales* who discovers the key-phrase *Open Sesame* to enter a robbers' cave.

Ali Bey (1766–1818) is the assumed name of a Spanish traveller, Domingo Badia y Leblich. He was a student of Arabic and of the customs and manners of the East. Travelled much in the East, and made a pilgrimage to Mecca. Was a Bonapartist, and wrote an account of his travels in Asia and Africa. *d.* at Aleppo.

Ali Pasha (1741–1822), the Lion, was *b.* in Albania. The early death of his father affected his mother so much that she became imbued with one idea, namely vengeance. To this idea her son was constantly educated. He showed very shortly that many of the wild impulses in his mother's temperament were inherited, for he murdered his brother in order to ensure his own position, and later, upon a charge of poisoning, killed his mother. In 1789 he was appointed to check the system of brigandage so scandalously rife in the dist. But he instituted instead a method of cunning bribery, and was often interested in the predatory ventures. He helped the Turks during the Austro-Russian War. A career of cool impudence, deliberate betrayal, and high daring ended in his being killed by Sultan Mahmoud. The character of such a man is easily ascertained from the account of his life. The cruelty of his revenge was truly fiendish. His administration rested upon the principle of terror; he certainly extirpated the robbers and other criminals and rendered his country secure from all depredations but his own. He was a Mussulman only by name: he fully protected the Greeks and other Christians in the exercise of their religion, and allowed them to have schools and even a lyceum and library. He treated all nationalities alike: the Turks liked him least because he would not allow them to ill-use the rest of the people.

Aliaga, a tn. near Manila, in the prov. of Nueva, Ecya, Luzon, in the Philippine Is. The country is healthy and fertile, producing Indian corn, tobacco, rice, and sugar. Pop. about 13,000.

Alias, a name given to a second writ when the previous one has been impossible to deliver or failed in effect. The term, however, has been corrupted, and applies now to false names used by criminals.

Alibi (Lat. *alibi*, elsewhere), the plea of a person who, charged with a crime, alleges that he was elsewhere when the crime was committed, and thus could not be guilty.

Alicante, a prov. in S.E. Spain, formed in 1833 of dists. of provs. of Valencia and Murcia. The surface is very diversified and the climate is temperate. Cereals are largely grown and great attention is given to rearing of silk-worms. Area, 2096 sq. m. Pop. 470,149.

Alicante is the cap. of the prov. of that name, and one of the chief seaports of the country. Popular health resort, and is an episcopal see. Pop. 55,300.

Alicata, called 'l'Amata' (the Beloved), is a fortified tn. on the S. coast of Sicily, and does a considerable trade. Here Regulus defeated the Carthaginians at the naval battle of Ecnomus, 256 B.C. It was sacked by the Turks, 1543. Pop. 22,000

Alice, a tn. in Cape Colony, near Fort Beaufort. Situated in its

vicinity is the mission station of Lovedale.

Alice Maud Mary, Grand-duchess of Hesse (1843–78), the second daughter of Queen Victoria. As a child she was fond of all manner of sports, and her childhood passed without an:
1862 she
Hesse, wh
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princess nursed him with the greatest care, and after his death devoted herself to consoling her mother. Her letters, ed. by Dr. Sell, give a delightful impression of her as mother, daughter, and wife.

Alicudi, *see* LIPARI ISLANDS.

Alien (Lat. *alienus*, foreign), one who, resident in one state, is by birth or naturalisation the subject of another. The privilages and disabilities of As. in England have long been the subject of many statutes, one of the earliest being that passed in the reign of Edward III. The law as it at present stands is based on two Acts, the first, the Naturalisation Act 1870 (33 Vict. c. 14), and the second, the *Aliens Act 1905*, *regulating the immigration of As.* The former Act revised the whole legislation concerning As., removing many disabilities. Formerly an A. could not hold land even on leasehold tenure (if we except the special Scotch statutes of 1558 and 1607 granting this privilege to Fr. and Eng. subjects respectively), but the Act of 1870 removed this disqualification. An A. is, however, precluded from voting for, or becoming a menber of, parliament or a municipal body unless he has been naturalised, in which case, of course, he ceases to be an A. Neither can an A. own or hold any interest in a British ship, but with this exception he may own, acquire, and dispose of all manner of real or personal property in the same way as a natural-born British subject. On the other hand, the former privilege of an A. of being tried by a jury *de medietate linguæ*, *i.e.* a jury in criminal proceedings of which one-half are foreigners, has been abolished, but he can sit on a jury after ten years' domicile in England or Wales. It is doubtful whether he can sit on a Scotch jury, but he is expressly disqualified by statute from serving on an Irish. Five years' residence in the U.K. is necessary to qualify for naturalisation (*q.v.*). On obtaining his (or her) certificate of naturalisation he becomes a natural-born British subject, except that, unless there exists a treaty or law to the contrary, he may if he returns to his former country still be regarded by the laws of that country as its subject. That this is the case was brought prominently before the British public when, in 1911–12, Miss Kate Malecka, a natural-born British subject, *i.e.* the child born in England of an A. parent, was claimed by Russia to be a Russian subject, her father being a Pole. When on a visit to Warsaw, she was thrown into prison, kept there about a year, and finally sentenced to a long term of imprisonment and exile to Siberia, her British nationality not being recognised by Russian law. Diplomatic negotiation secured her a free pardon from the Tsar. The son and grandson of an Eng. father, even if born abroad, are Eng. subjects. This is not affected even if the mothers were foreigners. The children of English women by As. are As. unless born in this country, and a woman by marrying a foreigner becomes an A. On the other hand, a foreign woman on marrying an Englishman becomes a British subject.

Although the number of As. in the U.K. is very small, being but 2 per cent. of the pop., and smaller than in any European country except Spain, it has been thought advisable from time to time to restrict the influx of As. In 1792–3 Lord Granville's ministry carried the Alien Acts enabling the crown to deport the A. subjects of states at war with England, the Act at that time being directed against France in particular. The Alien Act 1905 aimed at excluding from landing in this country persons suffering from incurable diseases, feeble-minded persons or lunatics, criminals, and persons so poor as likely to become a charge on the rates. In keeping with the traditional attitude of this country towards the right of asylum, the immigrant who can prove that he is fleeing his country to avoid religious or political persecution is exempted from the clause relating to lack of means. The Act defines an immigrant ship as one carrying more than twenty A. steerage passengers. Such a ship can only discharge her human freight at ports where immigrant officers are stationed. Any immigrant rejected by the immigrant officer at the port of debarkation can appeal to a board appointed by the Home Secretary. The Home Secretary is empowered to expel from the country any A. convicted of a criminal offence whom the judge recommends for deportation, but the judge has no such power. This was exemplified in the case of the notorious anarchist Malatesta, 1912, whom the Home Secretary refused to expel although a recommendation to this effect was made by the Common Serjeant who tried him.

Under the Aliens Orders (made under the Aliens Restriction Acts 1914, 1919). Any A. coming from outside the U.K. must obtain the leave of an immigration officer to land in the U.K. This leave is refused in various cases, *e.g.* where the A. has no means of subsistence, or, though seeking work, cannot produce a permit issued by the Ministry of Labour. Resident As. must be registered, and deportations on certain grounds can be ordered by the Home Office, *e.g.* in the case of an A. convicted of felony or living in insanitary conditions. These restrictions are provided for in the Aliens Restriction Act 1914, as amended by the Act of 1919. The Act of 1914 was essentially a war-time measure, but the effect of the Amending Act of 1919 is to make its provisions, as amended, virtually perpetual. Where expulsion is ordered, the Secretary of State must pay the whole or part of the As. expenses of deportation, including the maintenance of the A. and of any dependants he may have with him.

An aspect of the A. question which is growing in importance is the attempt of countries peopled by European stocks to keep out yellow and other coloured persons. Especially is this the case in the U.S.A. and the Australian and S. African colonies of Great Britain; Australia carrying it to the length of putting a poll-tax of £100 on coloured immigrants. How long this policy will be maintained, especially in view of the growing power of Japan and China, is problematical. Australia, Canada, and the U.S.A. prohibit the immigration of contract labour. Under various Acts, the quota of A. immigrants into these countries, and into S. Africa, is in a fixed ratio of Anglo-Saxon to S. European persons. The present table of quotas for intending immigrants into the U.S.A. was introduced in July 1929. It changes the old basis of calculation entirely, and reverts to a calculation based on an estimate of the racial divisions when the U.S.A. became a nation, or, in other words, the Act goes back to the ancestors in the census of 1790. Previously to 1929 a percentage of the nationals of the 1890 census was taken as the quota. The new quota reflects an important change of policy, which is designed to keep out all aliens save a quota loaded in favour of the Nordic countries, and the motive of the new policy was the fear that 'Old America,' mainly Anglo-Saxon, was being overwhelmed with other nationals. Probably 70 per cent. of the U.S.A. pop. have British blood in their veins, and the present quota gives a preference to the solely British. Only the Consular officials of the State Department have power to issue the essential passport visas. The status of As. in U.S.A. is determined principally by state laws, though these have to be congruent with Federal treaties with foreign powers. An A. does not possess political rights, nor is he subject to the political duties of a citizen, yet may be required to serve in the militia or police of the state. The laws of the states relative to ownership of real estate by As. vary, but in the majority of cases an A. may buy, sell, and devise real property. A friendly A. may contract, sue, and be sued in the state and Federal courts while allowed to remain in the country, but may be expelled or deported at any time, subject to treaty stipulations. An A. enemy is not allowed to maintain any action in the courts of the U.S.A. (but he may be sued), nor can he enter into valid contracts with citizens. The percentage of A. population in the U.S.A. varies very much with the locality, from 2½ per cent. to nearly 40 per cent. The average approaches 20 per cent., and is slowly rising.

Alienation, in law a term used to denote the voluntary transfer of estates from one person to another by conveyance and not by inheritance.

Alif, the first letter of the Arabic alphabet (*see* ALPHABET) and also of the word Allah (God). The letter is used as a symbol for the Almighty.

Aligarh, a city and dist. in the N.W. provs. of India. It became a fortress in 1759 under Sindhia acting for the Fr., and was stormed by the British in 1803. Area of dist. of Aligarh 1957 sq. m.; pop. 1,200,822; city, 67,776.

Alignment, *see* PRINTING.

Alignments, an archæological expression used to denote the arrangement of rows of menhirs or upright stones in parallel lines. Famous examples are at Carnac in Brittany, and at Callernish in the is. of Lewis in Scotland.

Alima, a trib. of the Lower Congo.

Aliment, Alimentary Allowance, *see* ALIMONY.

Alimentary Canal, the name given to the whole digestive tract from the mouth to the anus. It includes the mouth, œsophagus, stomach, intestines with the cæcum, rectum, and anus. *See* separate headings.

Alimentary Fund is money provided for the maintenance of the recipient. This provision cannot be claimed by creditors. A debtor, however, cannot provide an A.F. for his own use.

Alimony is the sum of money

ordered by the court to be paid by either the husband or wife in a divorce case or judicial separation towards the maintenance of the other party. It must be proved that the person against whom the order is made has the means to pay. A. varies from one-fifth to one-half of the joint income. *See* DIVORCE.

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Aliphatic Compounds form one of the great divisions of organic compounds. They are so called on account of the fact that the fats are among the most typical members of this division (Gk. ἄλειφαρ, fat). A. Cs. are characterised by the open-chain skeleton of carbon atoms in their molecules, as contrasted with the closed-ring skeleton found in aromatic and heterocyclic compounds. All A. Cs. may be regarded as ultimately derived from methane or marsh-gas, CH_4, by processes of replacement. Among the principal members of the group are the *paraffins* (including methane, ethane, pentane, petrol, paraffin oil, lubricating oil, vaseline, and paraffin wax), the *olefines* (*e.g.* ethylene, C_2H_4), *acetylene* (C_2H_2), the *alcohols* (*q.v.*), ...*ther*, *chloroform*, *acetic*, and other ...cids, *esters* (*e.g.* ethyl acetate or acetic ...ther), certain classes of *amines* (*q.v.*), ...he *carbohydrates*, such as starch, ...gar, and cellulose, and of course the ...*ls* themselves. In general proper...es, A. Cs. are distinguished from ...omatic compounds in numerous ...ys, particularly in their behaviour ...th nitric acid and sulphuric acid.

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Aliwal North is a tn. and dist. of S. Africa on the Orange R. It is a trading and agric. centre for the N.E. part of the Cape Prov. and the adjacent regions of Basutoland and Orange Free State. It contains many fine buildings and avenues; pop. 6297, a quarter of whom are whites. Aliwal South is situated near Mossel Bay, and is the seaport for the Grasveld dist. It and Aliwal North were named in honour of Sir H. Smith, governor of Cape Colony in 1847–52.

Alizarin, ($C_{14}H_6O_2(OH)_2$), or αβ-dihydroxyanthraquinone, a derivative from anthraquinone, known to the ancients as extracted from madder-

root, and used by them for dyeing. It is now prepared synthetically from anthracene. A. crystallises in dark red prisms and sublimes in orange-coloured needles, melting at 290° C. It is almost insoluble in water, but dissolves in alcohol. It yields with metallic oxides magnificently coloured insoluble compounds called 'lakes,' to which it owes its great value for dyeing purposes. Ferric oxide with A. gives a violet-black compound, chromium oxide a claret, calcium oxide a blue, and aluminium and tin give different shades of red.

Aljubarrota is the name of a tn. in Portugal. Here John I. of Portugal defeated John I. of Castile, and secured his country's independence, Aug. 14, 1385.

Alk, the resin obtained from the turpentine tree (*Pistacia terebinthus*), which grows chiefly in the region of the Mediterranean. In its fluid state it is called Cyprian or Chian turpentine.

Alkahest, *see* ALCAHEST.

Alkali, the name applied to a group of metals comprising lithium, sodium, potassium, rubidium, and cæsium. These metals form hydroxides which are soapy to the touch and are easily distinguished from acids and neutral bodies by their action on litmus, turmeric, methyl-orange, and other indicators. The term is sometimes applied to the hydroxides only, but in the important A. manuf. it includes the carbonates, and is particularly associated with carbonate of soda.

The hydroxide and carbonate of the radical *ammonium* (NH_4) are included among the alkalis.

The word alkali is derived from the Arabic *al-qaliy*, ashes, from the fact that soda and potash were derived from the ashes of plants; in fact, for centuries this was the only method of manufacturing soda known. In 1793 the Fr. gov. were faced with the necessity of finding some method of soda manuf., as, owing to the effect of the Revolution on commerce, France was cut off from the chief sources of the world's supply. In response to the gov.'s appeal, Citizen Leblanc elaborated a process, which has now become obsolete (having been replaced by the ammonia-soda process, for which see below), but was very largely employed for over a century. It consisted in heating salt with sulphuric acid, and subjecting the sodium sulphate so obtained, mixed with coal and limestone, to a high temperature in a reverberatory furnace. The sodium carbonate was then dissolved out of the residual mass, and the solution evaporated, when crystals of washing-soda or sodium carbonate decahydrate, $Na_2CO_3,10H_2O$, were obtained. The Leblanc process would have been given up long before it actually expired but for the fact that two important by-products, viz. hydrochloric acid and sulphur, were obtained from it.

Ammonia-soda process.—In this process, brine is saturated with ammonia and filtered. The filtrate is then treated with carbon dioxide in a carbonating tower, consisting of a series of cylindrical compartments through which the brine slowly percolates. The carbon dioxide is blown in at the bottom of the tower, so that the following reaction takes place: $NH_3 + NaCl + H_2O + CO_2 = NaHCO_3 + NH_4Cl$.

The liquid sludge that flows out at the bottom of the tower is filtered in vacuum filters, and the residue of sodium bicarbonate left in the filters is then heated, when it splits up into sodium carbonate, steam, and carbon dioxide: $2NaHCO_3 = Na_2CO_3 + H_2O + CO_2$.

The main advantages of the ammonia-soda process (sometimes known as the Solvay process, after its inventor, a Belgian chemist) are: (i) it yields a very pure product, (ii) it requires much less labour, (iii) there are no noxious by-products.

Caustic soda or sodium hydroxide ($NaOH$) is obtained by the electrolysis of brine; chlorine is given off during the electrolysis, and this also is a valuable chemical product. Sodium and potassium hydroxides are white, deliquescent, crystalline solids easily soluble in water. Like all As., they neutralise acids to form salts.

In medicine the term A. is restricted to the hydroxides which are used as caustics and for the neutralisation of acids. Ammonia is particularly valuable for counteracting the poison in the stings of insects, immediate application generally having the result of neutralising the acid. A. poisoning is treated by giving the patient dilute acid, such as vinegar. As an antidote to acid poisoning, the carbonates should be used; powdered chalk, or, in an emergency, whiting scraped from the wall or ceiling is suitable.

Alkali Lands are regions where the soil contains quantities of alkali salts, *e.g.* in Nebraska, Montana, and New Mexico. Such soil requires very little rainfall, and to prevent damage to the estates caused by abundant rainfall the lands are carefully drained and treated with gypsum.

Alkaline Earths, a name given to the group of metals comprising *calcium*, *strontium*, and *barium*. Formerly the oxides of these metals were considered to be elementary sub-

ordered by the court to be paid by either the husband or wife in a divorce case or judicial separation towards the maintenance of the other party. It must be proved that the person against whom the order is made has the means to pay. A. varies from one-fifth to one-half of the joint income. *See* DIVORCE.

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Alison, Sir Arch. (1792–1867), the younger son of the Rev. Arch. Alison (*supra*). Born in Shropshire, studied at Edinburgh University. Called to Scottish bar in 1814. Toured the Continent and was made an advocate-depute for Scotland in 1822. Became prominent as an authority on politics and law. Pub. *The Principles of Criminal Law of Scotland*, 1832–3. Among his other works are a *History of Europe during the French Revolution*, *Principles of Population*, *Free Trade and Protection*. Created baronet in 1852.

Alison, Gen. Sir Arch. (1826–1907), eldest son of Sir Arch. A. Served in the Crimea, and lost an arm at the relief of Lucknow. He was second in command in the Ashanti Expedition of 1873–4. Promoted to major-general in 1877. Served in Egyptian campaign and led the Highland Brigade at Tel-el-Kebir. Was made G.C.B. in 1887, and promoted to general in 1889. Retired in 1893.

Aliwal North is a tn. and dist. of S. Africa on the Orange R. It is a trading and agric. centre for the N.E. part of the Cape Prov. and the adjacent regions of Basutoland and Orange Free State. It contains many fine buildings and avenues; pop. 6297, a quarter of whom are whites. **Aliwal South** is situated near Mossel Bay, and is the seaport for the Grasveld dist. It and Aliwal North were named in honour of Sir H. Smith, governor of Cape Colony in 1847–52.

Alizarin, ($C_{14}H_6O_2(OH)_2$), or αβ-dihydroxyanthraquinone, a derivative from anthraquinone, known to the ancients as extracted from madder-

root, and used by them for dyeing. It is now prepared synthetically from anthracene. A. crystallises in dark red prisms and sublimes in orange-coloured needles, melting at 290° C. It is almost insoluble in water, but dissolves in alcohol. It yields with metallic oxides magnificently coloured insoluble compounds called 'lakes,' to which it owes its great value for dyeing purposes. Ferric oxide with A. gives a violet-black compound, chromium oxide a claret, calcium oxide a blue, and aluminium and tin give different shades of red.

Aljubarrota is the name of a tn. in Portugal. Here John I. of Portugal defeated John I. of Castile, and secured his country's independence, Aug. 14, 1385.

Alk, the resin obtained from the turpentine tree (*Pistacia terebinthus*), which grows chiefly in the region of the Mediterranean. In its fluid state it is called Cyprian or Chian turpentine.

Alkahest, see ALCAHEST.

Alkali, the name applied to a group of metals comprising lithium, sodium, potassium, rubidium, and cæsium. These metals form hydroxides which are soapy to the touch and are easily distinguished from acids and neutral bodies by their action on litmus, turmeric, methyl-orange, and other indicators. The term is sometimes applied to the hydroxides only, but in the important A. manuf. it includes the carbonates, and is particularly associated with carbonate of soda.

The hydroxide and carbonate of the radical *ammonium* (NH_4) are included among the alkalis.

The word alkali is derived from the Arabic *al-qaliy*, ashes, from the fact that soda and potash were derived from the ashes of plants; in fact, for centuries this was the only method of manufacturing soda known. In 1793 the Fr. gov. were faced with the necessity of finding some method of soda manuf., as, owing to the effect of the Revolution on commerce, France was cut off from the chief sources of the world's supply. In response to the gov.'s appeal, Citizen Leblanc elaborated a process, which has now become obsolete (having been replaced by the ammonia-soda process, for which *see* below), but was very largely employed for over a century. It consisted in heating salt with sulphuric acid, and subjecting the sodium sulphate so obtained, mixed with coal and limestone, to a high temperature in a reverberatory furnace. The sodium carbonate was then dissolved out of the residual mass, and the solution evaporated, when crystals of washing-soda or sodium carbonate decahydrate, $Na_2CO_3,10H_2O$, were obtained. The Leblanc process would have been given up long before it actually expired but for the fact that two important by-products, viz. hydrochloric acid and sulphur, were obtained from it.

Ammonia-soda process.—In this process, brine is saturated with ammonia and filtered. The filtrate is then treated with carbon dioxide in a carbonating tower, consisting of a series of cylindrical compartments through which the brine slowly percolates. The carbon dioxide is blown in at the bottom of the tower, so that the following reaction takes place: $NH_3 + NaCl + H_2O + CO_2 = NaHCO_3 + NH_4Cl$.

The liquid sludge that flows out at the bottom of the tower is filtered in vacuum filters, and the residue of sodium bicarbonate left in the filters is then heated, when it splits up into sodium carbonate, steam, and carbon dioxide: $2NaHCO_3 = Na_2CO_3 + H_2O + CO_2$.

The main advantages of the ammonia-soda process (sometimes known as the Solvay process, after its inventor, a Belgian chemist) are: (i) it yields a very pure product, (ii) it requires much less labour, (iii) there are no noxious by-products.

Caustic soda or sodium hydroxide ($NaOH$) is obtained by the electrolysis of brine; chlorine is given off during the electrolysis, and this also is a valuable chemical product. Sodium and potassium hydroxides are white, deliquescent, crystalline solids easily soluble in water. Like all As., they neutralise acids to form salts.

In medicine the term A. is restricted to the hydroxides which are used as caustics and for the neutralisation of acids. Ammonia is particularly valuable for counteracting the poison in the stings of insects, immediate application generally having the result of neutralising the acid. A. poisoning is treated by giving the patient dilute acid, such as vinegar. As an antidote to acid poisoning, the carbonates should be used; powdered chalk, or, in an emergency, whiting scraped from the wall or ceiling is suitable.

Alkali Lands are regions where the soil contains quantities of alkali salts, *e.g.* in Nebraska, Montana, and New Mexico. Such soil requires very little rainfall, and to prevent damage to the estates caused by abundant rainfall the lands are carefully drained and treated with gypsum.

Alkaline Earths, a name given to the group of metals comprising *calcium*, *strontium*, and *barium*. Formerly the oxides of these metals were considered to be elementary sub-

stances, and were known as earths. The oxides possess an alkaline reaction and neutralise acids.

Alkaloids, organic substances of complex composition and basic character found in plants of certain families. The name persists from the old classifications of organic substances into acids, bases, and neutrals to correspond with the classification of inorganic substances. The old name of alkaloid (resembling alkali) has been retained in the absence of a better mode of classification. Only a few As., such as coniïne and nicotine, are liquids; most of them are crystalline solids. They are alkaline in reaction, possess a bitter taste, and are generally insoluble in water, but soluble in alcohol. Some of them are excessively poisonous, the general antidote being strong tea. They are obtained by cutting up the plants and macerating the mass with acidified water in a conical vat, where a layer of lint receives the percolated liquid. If a volatile A., it is separated with steam after making the mixture alkaline; if an insoluble A., it may be obtained by filtration, after which it may be purified by crystallisation. The more important As. are:

Coniïne, occurring in spotted hemlock. It is a colourless liquid with a stupefying odour, and is very poisonous.

Nicotine, occurring in the tobacco plant. It is a colourless oily liquid with a characteristic odour, and turns brown on exposure to the air; very poisonous.

Atropine, occurring in 'deadly nightshade.' It is a crystalline solid, extends the pupil of the eye and is very poisonous.

Cocaine, occurring in coca leaves. It is a crystalline solid, soluble in alcohol, and is used as a local anæsthetic.

Morphine, constituting 10 per cent. of opium (prepared from the capsules of *Papaver somniferum*). It is a crystalline solid, and is used as an anodyne and narcotic.

Narcotine, constituting 6 per cent. of opium. It is a crystalline solid, and slightly poisonous.

Quinine, occurring in cinchona. It is an important antifebrile.

Strychnine, occurring in *Strychnos nux vomica*. It is a crystalline solid, and causes death by tetanic spasms.

Alkan, Charles Valentin Morhange (1813–88), a Fr. pianist and composer, b. at Paris. His best known compositions are: *Marche Funèbre*, *Marche Triomphale*, *Études Caprices*, and *Préludes*.

Alkanet, see ANCHUSA.

Al-Khwarasmi, Arabian mathematician, b. in Khorassan, who *fl.* in the ninth century. He studied and made important astronomical calculations at Bagdad. He wrote several books on mathematics, among which was one on Hindu arithmetic, containing dissertations on the quadratic equations, etc. The original name of the work is *Al Jabr wa'l Muqabalah*, which was corrupted into Algebra. This book was the basis on which all subsequent mediæval works on algebra were founded.

Alkindi, an Arab philosopher and mathematician, b. at Basra. He *fl.* in the ninth century. He trans. Aristotle, and is the author of sev. original treatises. The Arabs consider him the supreme philosopher and regard him as the father of their philosophy.

Alkmaar (all sea), an anct. tn. of the Netherlands. It is situated on the N. Holland Canal, and is itself intersected by a network of canals. The church and town hall are in Gothic style. Pop. 25,000.

Alkmaar, Henry of, or **Hinrek von Alkmer**, see REINEKE FUCHS.

Alkoran, see KORAN.

Alkyl, a chemical term denoting radicals of the formula C_nH_{2n+1}; the chief members are *methyl* (CH_3), *ethyl* (C_2H_5), *propyl* (C_3H_7), and *amyl* (C_5H_{11}). These radicals do not exist in the free state, but are present in such compounds as alcohols, esters, aldehydes, ketones, and alkyl halides.

Allard, Jean François (1783–1839), a Fr. general who first served under Napoleon. In 1815 he left France and went to Lahore, where he entered the service of Ranjit Singh. He organised the army according to the Fr. model, and was made generalissimo of the forces. He d. in India.

All Fools' Day, the first of April. The custom of sending one upon a pointless errand is supposed to have been a burlesque of the sending hither and thither of Christ from Annas to Caiaphas, and from Pilate to Herod.

All-Hallows, All-Hallowmas, or simply **Hallowmas**, the Old Eng. name for All Saints' Day, or the first of November. See ALL SAINTS' DAY.

All Saints' Bay, on which stands S. Salvador or Bahia, is situated on the E. coast of Brazil. It is 37 m. long from N. to S., and 27 m. wide in the widest part from E. to W., and is supposed to be large enough to afford anchorage for the navies of the whole world.

All Saints' Day (Nov. 1), called in Old Eng. All-Hallows, All-Hallowmas, or simply Hallowmas, is a feast in honour of all the saints, and was first definitely instituted in 835. The evening preceding All-Hallows is called 'Halloween,' and on this night ceremonies of Druidical origin—bon-

fires, bell-ringings, and domestic merry-makings, in which lamb's wool (ale or wine mixed with the pulp of roasted apples) was the prin. beverage —were once held. In England, Scotland, and Ireland fireside ceremonies were held, and the future was supposed to be made known. An account of these ceremonies is given in the poem of Burns entitled *Halloween*.

All Saints' Islands, *see* WEST INDIES.

All Souls' College, Oxford, was founded by Henry Chichele, Archbishop of Canterbury, 1437. In 1442 it was capable of receiving the warden and fellows, but it was not finished till the latter end of 1444.

All Souls' Day, a Roman Catholic festival held on Nov. 2, which was first instituted by Odilo in the monastery of Cluny, 998, and the observance soon became general in all Roman Catholic countries. On this day prayers and offerings are made for the dead.

Alla breve, a musical expression placed at the beginning of a piece, signifies that the time value of the notes is reduced to a half.

Allada, a tn. in the kingdom of Dahomey in Guinea. It is of considerable commercial importance, and has a pop. of about 10,000.

Allah (Arabic), the name used by Moslems to denote the Supreme Being. The word is a compound of two words, *al*, the definite article, and *elah*, God. The same word may be found in Arabic, Aramaic, Hebrew, and Old Arabic.

Allahabad, 'the holy city' of the Moslems, situated at the junction of the Rs. Jumna and Ganges in N.W. Hindostan, and also gives name to the dist. The most prominent part of the city is the fort built by Akbar, who gave the name A. to the city. Frequent pilgrimages are made to the city by the Hindoos. The prov. of A. was successively subject to the rulers of Delhi and Oude, but in 1801 was incorporated with the British possessions. A fair is held annually in Dec.–Jan. In 1861 it was made cap. of the N.W. Provs.; and in 1887 the university instituted. In front of the gateway inside the Fort is the Asoka Pillar, 35 ft. high, on which are inscribed the famous Edicts of Asoka issued about 242 B.C. and a record of the victories of Samudragupta about A.D. 350. There are two cathedrals, a public library, a garrison; Muir College, and the Mayo Memorial Hall with a tower 147 ft. high. On the chief day of the fair about 1,000,000 pilgrims bathe at the confluence of the rivers. Pop. (1921) *157,220*; dist. 4,795,666.

Allainval, Léonor-Jean-Christine Soulas d' (1700–53), a Fr. dramatic writer, *b.* at Chartres. Among his comedies are: *L'Ecole des Bourgeois*, 1728; *Le Mari Curieux*, 1731; *L'Embarras des Richesses*. He *d.* at Paris.

Allamanda, a genus of tropical plants of the order Apocynaceæ. *A. cathartica*, a climbing plant with yellow flowers, from the W. Indies, is used as a cathartic medicine, and has emetic and purgative properties.

Allan, David (1744–96), Scottish historical painter, *b.* at Alloa. Studied at Glasgow and Foulis's Academy, and later at Rome. Secured gold medal for his 'Origin of Painting.' Chief pictures, 'Highland Dance' and 'Scotch Wedding.' Died at Edinburgh.

Allan, Hugh (1810–82), founder of the Allan Line, was *b.* at Saltcoats in Ayrshire. He emigrated to Canada, and was one of the promoters of the Canadian Pacific Railway. He was knighted in 1871, and *d.* at Edinburgh.

Allan, Robert W. (*b.* 1852), a Scots marine and landscape painter and one of the founders of the Glasgow school of painting. His first great picture was 'The Funeral of Carlyle.'

Allan, Sir William (1782–1850), painter of history and scenes from Russian life. *B.* at Edinburgh; educated at High School there. Studied art under Graham of the Trustees' Academy with Wilkie, Burnet, and Alexander Turner. First exhibited picture, 'A Gipsy Boy with an Ass.' Among his famous paintings are: 'Peter the Great teaching his Subjects Shipbuilding,' 'The Stirrup Cup,' and 'Knox admonishing Mary Queen of Scots.' In 1805 went to Russia, but returned to Edinburgh, 1814. His health gave way and he went to Rome for a rest and change.

Allan Line, a British steamship company founded in 1852 by Sir Hugh Allan. The ships touch the prin. Canadian ports and sev. ports of U.S.A. and S. America. Was amalgamated with the Canadian Pacific Steamship Company in 1916.

Allantoin ($C_4H_6O_3N_4$), an organic substance found in the allantoic fluids of many animals. It is also formed in the oxidation of the uric acid with potassium permanganate, thus throwing light on the constitution of uric acid.

Allantois, a fœtal membrane derived from the mesoblastic and hypoblastic layers, characteristically developed in birds, reptiles, and mammals. In birds and reptiles it is developed from the lower end of the digestive tube, and has first the form of a small ovoid sac, but increases rapidly in size and makes its way into a space between the amnion and the serous membrane.

It finally encloses the whole embryo and yolk-sac together with the remains of the albumin, which by this time has been largely absorbed. The A. serves as a respiratory organ, exchange of gases readily taking place through the porous shell; its cavity serves as a urinary bladder, excrement being discharged into it from the kidneys. In many mammals a connection is often estab. between the A. and the uterine wall, by which nourishment is conveyed to the embryo. At birth this connection becomes part of the umbilical cord and is cast off, whilst the part that remains within the body develops into the urinary bladder.

Allardyce, Alexander (1846–96), writer, born in Aberdeenshire. He was sub-editor of the *Friend of India* and editor of the *Ceylon Times*. Author of sev. novels, among which are: *City of Sunshine*, *Balmoral*, and *Earlscourt*.

Allatius, Leo (1586–1669), a Gk., who was *b.* in the is. of Chios, where he founded a college, and *d.* at Rome. He was educated at the Gk. College, Rome, and after visiting his native country returned to Rome, where he was appointed librarian to the Vatican. He ed. manuscripts, trans. Gk. authors, and wrote original works. *See* his treatise *De Ecclesiæ Occidentalis et Orientalis perpetuâ Consensione.*

... ins, *see* APPALA-

...

... n Allegheny co., ... Allegheny and Ohio Rs.; one of the chief manufacturing dists. of Pa. An important railway terminus, has large manufactories, public buildings, and higher schools ... connect ... industr ... mills, a ... A. was ... 1874 A. ... destroy ... a flood ... has sev ... semina...

Allegheny River, *see* MISSISSIPPI RIVER.

Allegiance has been defined by Coke as 'the highest and greatest obligation of duty and obedience' of a subject, and a violation of A. constitutes the highest legal offence, namely treason. Every natural-born subject, every naturalised citizen, and every alien while within the kingdom, owes this duty to the king, his liege lord. Most public officials and many professional men are required to take the *Oath of Allegiance* when entering on their career. The claim of the popes of Rome to temporal power, particularly in the matter of releasing Catholics from A. to heretical sovereigns, was ... the cause of ... country. Th... the reign ... Catholics to ... was conside... necessarily offensive to their faith, but after long controversy and not a little persecution it was freed from this objection in 1778.

Allegory, a Gk. word signifying the description of one thing under the image of another, derived from ἄλλος, other, and ἀγορεύειν, to harangue. In literature, a figurative discourse in which the writer or speaker conveys to the mind a parallel idea by its resemblance in its properties and circumstances to the subject of his ostensible discourse. In this respect it resembles metaphor, and A. has often been described as 'extended metaphor.' This is the most usual signification of the word, but it is also used for other forms of art, and may be applied to painting, sculpture, or the histrionic art. As painting, one may mention the famous picture of Prudhon, 'Justice and Vengeance pursuing Crime,' and the many allegorical pictures of the great Eng. painter, G. F. Watts. The well-known picture of Holman Hunt, 'The Light of the World,' hung in St. Paul's Cathedral, is a good example of pictorial A. Reynolds Stephens's group, representing Queen Elizabeth ... playing on a ... ips as pieces, depicts in sculptural A. the struggle for sea supremacy between two nations. Returning to literature, in all branches of which one finds the use of A., it is important to realise the difference between A. and the fable. The fable, or, as it is sometimes termed, the apologue, has for its object the conveying of some moral precept or enforces some lesson for daily life, but an A. is by no means so limited in its scope. A further differentiation may be made that while, on the one hand, the merit of a fable lies in, and its lesson is emphasised by, its improbability, as, for example, Æsop's fable of the *File and the Viper*, where two inarticulate objects speak, or ... A. depends for ... fidelity and its ... ence to actual existence. A. has always been used for the personification of abstract ideas, and for its value in this direction has been much employed to assist the mind in grasping abstract principles. This teaching of the abstract by the concrete was often employed by Christ and other biblical characters in the form

of a parable, or short A., to bring home to their auditors in a more facile manner religious truths. But this personification of the abstract is not the whole function of A., and it has been employed to represent persons and countries. Thus, Edmund Spenser in his *Faerie Queene* depicts the Earl of Leicester, Sir Philip Sidney, and other Elizabethans, including the queen herself. Sir Thomas More, in his *Utopia*, sets forth his opinion as to how a country should be governed by an A. about an imaginary country, and Dean Swift, two centuries later, in his well-known As., *The Battle of the Books* and *The Tale of a Tub*, satirises the theological shams and follies of his time. It is a fact not to be lost sight of that the indirect attack of abuses by means of the A. was often the only method open to the would-be reformer. The use of A. dates from the earliest ages, and especially among the peoples of the East. It follows from the utility of A. for conveying more easily abstract ideas to the mind that philosophers should use it in the instruction of their pupils. Among those to employ this method of instruction one of the earliest was Plato, and nowhere does he employ it more effectively than in his famous A.—perhaps the most famous of all ancient As.—of the 'Cave,' which is to be found in his *Republic*. By means of an allegorical story of men in a cave believing that their shadows, thrown by a fire behind them on to the wall, are realities, he seeks to show the difference—a commonplace in all philosophical discourse—between the permanent 'idea' behind the ever-changing phenomenal world of 'appearance.' The term to *allegorise*, *i.e.* to interpret the literal significance of a narrative, giving it an esoteric or more spiritual meaning, is the converse of the above. Among those to apply this method to the Scriptures were Philo the Jew of Alexandria, who in the time of Christ so interpreted the O.T., and his method was followed by the early Christian sect of the same city, notably by Origen (A.D. 185–254). The latter had the hardihood to explain, what is of course universally conceded to-day, that the story of the Garden of Eden and the Fall was an A. The Neo-Platonists similarly sought to arrest the decay of Gk. mythology at about the same time and by the same methods. A. passed into the middle ages, and took its place in the 'miracle' plays of the time, and often 'moralities' of the fifteenth and sixteenth centuries. Among the best known of these 'moralities' is that called *Everyman*, an A. in which all men are personified in Everyman, who is called upon by God to give an account of his life. As was to be expected, the A. has played a large part in the development of poetry, and it was employed to such good purpose by Geoffrey Chaucer, the father of Eng. poetry, when he translated the mediæval *Romaunt of the Rose*, that he influenced the poets who followed him for nearly two hundred years. Chaucer's contemporary, Langland, produced in 1362 a remarkable A., *The Vision of Piers Plowman*, in which he satirised the customs of his time. With Edmund Spenser's *Faerie Queene* (1590) A. again rises to great heights in poetry, but perhaps the best known of all As. in the Eng. tongue is the *Pilgrim's Progress* of John Bunyan (1678). This story of the journey of Christian from 'this world to the next,' and the story of the siege of 'Man's Soul,' told in his book *The Holy War*, are written in the purest English. Another well-written A. is Addison's *Vision of Mirza*, which appeared in the *Spectator*. Of modern As. one may mention Olive Schreiner's *Dreams*, Jack London's *White Fang*, and Anatole France's *Ile des Penguins* in prose, and Maeterlinck's *Blue Bird* and Edmund Rostand's *Chanticleer* in drama.

Allegretto (It. dimin. of *allegro*), a musical term—a movement or time not so quick as allegro, but quicker than andante. At a walking pace.

Allegri, Antonio, *see* CORREGGIO.

Allegri, Gregorio (1590–1652), musical composer, *b.* in Rome. He will always be remembered as being the composer of the famous *Miserere* written for nine voices, and to-day sung in Holy Week in the Sistine Chapel.

Allegro (Lat. *alacer*, joyful, brisk), a musical term denoting a brisk, sprightly movement.

Alleine, Joseph (1634–68), author of *The Alarm of the Unconverted*. Nonconformist divine, *b.* at Devizes. Educated at Oxford. Ordained in 1654. Began his ministry at Taunton. Sent to prison for his 'evangelising' work with a grandfather of Wesley.

Alleine, Richard (1611–81), a Puritan divine, *b.* in Somerset. He is chiefly remembered for his *Vindiciæ Pietatis*, 1663.

Allen, Alin, or Alyn, a trib. of the Dee, N. Wales. It rises in Denbighshire and flows through Flintshire into the Dee.

Allen, Bog of, is the name given to a series of morasses in the counties of Kildare, King, and Queen.

Allen, Chas. Grant (1848–99), Eng. author, was *b.* at Kingston, Canada. Studied at Oxford, and graduated

in 1870. Became schoolmaster in Jamaica, but made a permanent home later in England. Possessed good scientific knowledge and gift of expression. Chief works of science are: *Physiological Æsthetics*, 1877; *Evolutionist at Large; Evolution of the Idea of God*. Among his best novels are: *The Devil's Die, The Great Taboo*, and *The Woman Who Did*.

Allen, Ethan (1739–89), was *b.* at Litchfield, Connecticut. After the outbreak of the American War of Independence he took arms against the British and captured the port of Ticonderoga from them in 1775. In the same year he was captured by the British near Montreal, and remained prisoner until 1778. Wrote a book on reason, and an account of his imprisonment.

Allen, Henry T. (1859–1930), distinguished American soldier, *b.* Sharpsburg, Ky., U.S.A. Graduated U.S. Military Academy 1882, being named Second Lieutenant 2nd U.S. Cavalry. Gradually rose in rank until retired with rank of Major-General in 1923. Explored Alaska 1885–6; instructor at U.S. Military Academy 1888–90; Military attaché in Russia and Germany 1890–98; then served in Spanish-American War and the campaign against the rebellious Filipinos. Governor, is. of Leyte in the Philippines, 1901. Organised the famous Filipino Constabulary 1901 and appointed its chief by Act of Congress 1903. With the Mexican punitive expedition in 1916. Went to France as commander of the 90th Division of the American Expeditionary Force in 1917, taking part in the battles in the Toul sector, St. Mihiel and Argonne. Made commander of the 8th Army Corps late in 1918. Commander-in-chief of the American army of occupation in the Rhineland July 1919, with he[illegible] Awarded Disti[illegible] by his countr[illegible] with palm ar[illegible] Legion of Hon[illegible] several books [illegible] pation.

Allen, Horatio (1802–89), American civil engineer, *b.* at Schenectady, New York. He made the first railway trip in America, operating the Stourbridge Lion in 1829 at Honesdale, Pa. He was chief engineer of the South Carolina Railway and later the Erie Railway, of which he was also president. He was consulting engineer to the Panama Railway and president of the American Society of Civil Engineers.

Allen, Sir Hugh Percy (1869), Brit. [illegible]

Cathedral as asst. organist. In 1897–8 he was organist at St. Asaph Cathedral. Conductor of the Bach Choir, London, 1901–20; professor of music, Oxford Univ., since 1918; and now Director of the Royal College of Music, London. As professor of music at Oxford, A. has done valuable work in widening the scope and practicality of the courses there; while as a choral conductor he has always been highly successful.

Allen, Ira (1751–1814), first secretary of Vermont, brother of Ethan A. (*q.v.*); *b.* in Cornwall county; removed to Vermont, 1772, where he served as lieutenant under his brother Ethan. As a member of the legislature he was zealous in asserting the independence of Vermont. He took an active part in the negotiation *re* the 'New Hampshire Grants.' In 1795 he visited Europe to buy arms, and was arrested at Ostend and brought to England, where he was charged with supplying arms to the Irish rebels. He was acquitted after a trial lasting eight years.

Allen, James Lane (1849–1925), American author, *b.* near Lexington, Kentucky. His novels deal chiefly with life in Kentucky, and include *The Kentucky Cardinal, Aftermath, A Summer in Arcady, A Cathedral Singer, The Kentucky Warbler, The Alabaster Box*, and *The Choir Invisible*—his best work.

Allen, Joel Asaph (1838–1921), *b.* at Springfield, Mass.; was a noted zoologist. He accompanied Agassiz on an expedition to Brazil. Held a post as curator of ornithology and mammalogy [illegible] in 1885 was [illegible] office at the [illegible] Wrote many works on American fauna and on biological theory.

Allen, John (1771–1843), political and historical writer, *b.* at Bedford, near Edinburgh. Trans. Culver's *Introduction to the Study of the Animal Economy*. Toured Spain and the Continent with Lord Holland.

Allen, Karl Ferdinand (1811–71), Danish historian. He was professor of history and archæology at Copenhagen, and was a keen democrat. [illegible] *[M]anual of Dan*[illegible] [and] a *History of* [illegible]

[illegible] of Bath, an Eng[illegible] was acquainted [illegible] ing, and he ap[illegible] worthy in *Tom Jones*. His benevolence became proverbial.

Allen, Thomas (1542–1632), mathematician and astronomer, *b.* at Uttoxeter. He collected many valuable manuscripts on astrology and the black art.

Allen, William (1532–94), cardinal, *b.* at Rossall; educated at home and afterwards at Oxford. Graduated in 1550 and elected fellow in the same year. In 1556 chosen prin. of St. Mary's Hall, Oxford. His zeal for the Catholic faith offended the civil authorities and he went to Holland. He became priest at Mechlin in 1557, made a pilgrimage to Rome, and was created cardinal in 1587.

Allen, William Francis (1830–89), Amer. classical scholar, *b.* at Northborough, Mass. In 1867 became prof. of anct. languages and hist. at Wisconsin Univ. The Allen and Greenough series of schoolbooks contain numerous contributions of his. Joint editor of a *Collection of Slave Songs* (1867).

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[*Topical Press*

VISCOUNT ALLENBY

Allende, a tn. of Mexico in the Guanajuato state, about 250 m. N.W. of Mexico and with a pop. of 16,000.

in 1870. Became schoolmaster in Jamaica, but made a permanent home later in England. Possessed good scientific knowledge and gift of expression. Chief works of science are: *Physiological Æsthetics*, 1877; *Evolutionist at Large; Evolution of the Idea of God.* Among his best novels are: *The Devil's Die, The Great Taboo*, and *The Woman Who Did.*

Allen, Ethan (1739–89), was *b.* at Litchfield, Connecticut. After the outbreak of the American War of Independence he took arms against the British and captured the port of Ticonderoga from them in 1775. In the same year he was captured by the British near Montreal, and remained prisoner until 1778. Wrote a book on reason, and an account of his imprisonment.

Allen, Henry T. (1859–1930), distinguished American soldier, *b.* Sharpsburg, Ky., U.S.A. Graduated U.S. Military Academy 1882, being named Second Lieutenant 2nd U.S. Cavalry. Gradually rose in rank until retired with rank of Major-General in 1923. Explored Alaska 1885–6; instructor at U.S. Military Academy 1888–90; Military attaché in Russia and Germany 1890–98; then served in Spanish–American War and the campaign against the rebellious Filipinos. Governor, is. of Leyte in the Philippines, 1901. Organised the famous Filipino Constabulary 1901 and appointed its chief by Act of Congress 1903. With the Mexican punitive expedition in 1916. Went to France as commander of the 90th Division of the American Expeditionary Force in 1917, taking part in the battles in the Toul sector, St. Mihiel and Argonne. Made commander of the 8th Army Corps late in 1918. Commander-in-chief of the American army of occupation in the Rhineland July 1919, with headquarters at Coblentz. Awarded Distinguished Service Medal by his country and Croix de Guerre with palm and Commander of the Legion of Honour by France. Wrote several books on the Rhineland occupation.

Allen, Horatio (1802–89), American civil engineer, *b.* at Schenectady, New York. He made the first railway trip in America, operating the Stourbridge Lion in 1829 at Honesdale, Pa. He was chief engineer of the South Carolina Railway and later of the Erie Railway, of which he was also president. He was consulting engineer to the Panama Railway and president of the American Society of Civil Engineers.

Allen, Sir Hugh Percy (1869), Brit. professor of music, *b.* at Reading. Began his musical career at Chichester Cathedral as asst. organist. In 1897–8 he was organist at St. Asaph Cathedral. Conductor of the Bach Choir, London, 1901–20; professor of music, Oxford Univ., since 1918; and now Director of the Royal College of Music, London. As professor of music at Oxford, A. has done valuable work in widening the scope and practicality of the courses there; while as a choral conductor he has always been highly successful.

Allen, Ira (1751–1814), first secretary of Vermont, brother of Ethan A. (*q.v.*); *b.* in Cornwall county; removed to Vermont, 1772, where he served as lieutenant under his brother Ethan. As a member of the legislature he was zealous in asserting the independence of Vermont. He took an active part in the negotiation *re* the 'New Hampshire Grants.' In 1795 he visited Europe to buy arms, and was arrested at Ostend and brought to England, where he was charged with supplying arms to the Irish rebels. He was acquitted after a trial lasting eight years.

Allen, James Lane (1849–1925), American author, *b.* near Lexington, Kentucky. His novels deal chiefly with life in Kentucky, and include *The Kentucky Cardinal, Aftermath, A Summer in Arcady, A Cathedral Singer, The Kentucky Warbler, The Alabaster Box*, and *The Choir Invisible*—his best work.

Allen, Joel Asaph (1838–1921), *b.* at Springfield. Mass.; was a noted zoologist. He accompanied Agassiz on an expedition to Brazil. Held a post as curator of ornithology and mammalogy at Cambridge, Mass., and in 1885 was appointed to a similar office at the museum at New York. Wrote many works on American fauna and on biological theory.

Allen, John (1771–1843), political and historical writer, *b.* at Bedford, near Edinburgh. Trans. Culver's *Introduction to the Study of the Animal Economy.* Toured Spain and the Continent with Lord Holland.

Allen, Karl Ferdinand (1811–71), Danish historian. He was professor of history and archæology at Copenhagen, and was a keen democrat. His chief works are a *Manual of Danish History*, 1840, and a *History of the Three Northern Kingdoms.*

Allen, Ralph (1694–1764), the Man of Bath, an Eng. philanthropist. He was acquainted with Pope and Fielding, and he appears as Squire Allworthy in *Tom Jones.* His benevolence became proverbial.

Allen, Thomas (1542–1632), mathematician and astronomer, *b.* at Uttoxeter. He collected many valuable manuscripts on astrology and the black art.

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Allenstein, tn. in E. of Prussia, on the Alle, a trib. of the Pregel. Here the Russians and Prussians were defeated by Soult in 1807. The tn. has several breweries. During the Great War, the Russian armies, under the generalissimo, the Grand Duke Nicholas, when invading E. Prussia, in 1914, were opposed by three serious obstacles: the rivers, lakes, and marshes between Insterburg and Johannisburg, the two Ger. army corps at Königsberg and Allenstein respectively, and the line of the Vistula. General Rennenkampf, defeating the Germans at Gumbinnen, Aug. 17–20, drove them out of Königsberg, while another and larger Russian army broke through between the lakes and the Vistula and captured A. This, however, marked the limit of Russian success against Germany in the Great War, for at Tannenberg on Aug. 26 General von Hindenburg completely routed them. (*See* TANNENBERG.) Pop. 38,100.

Allentown, co. tn. of Lehigh co., Pennsylvania, on the Lehigh R. Important manufacturing centre. Silk and silk goods is the most important industry. The tn. was settled first in 1751, and owes its name to John Allen, son of chief justice of the prov. Pop. 92,052.

Alleppi, or **Aulapalai**, in Travancore, India, is a seaport. First in commercial importance. Fine harbour, rajah's palace, and a Protestant church. Lies 33 m. S. of Cochin.

Allerion, an heraldic device, consisting of an eagle with outspread wings, but without beak or feet. Example of it in Montmorency arms.

Allestree, Richard (1619–81), divine, at Uppington, Shropshire. His family came of good stock but were reduced in circumstances. When the Parl. forces sacked the colleges A. at great personal risk saved many treasures. After military service A. took orders. He was expelled from the university for refusing to submit to the authority of parliament. He became a professor of divinity at Christ Church after the Restoration. His most noted work is his treatise on the *Privileges of the University of Oxford.*

Alleyn, Edward (1566–1626), actor, founder of Dulwich College, *b.* Bishopsgate, London. Married Woodward in 1582. In 1600 with Henslowe, the Fortune Theatre, London. In 1604 became keeper of the royal game of bears, and mastiffs. Retired from stage, 1604. Building of college 1613. Obtained royal charter after some objection by Francis Lord Verulam.

Allgemeine Zeitung, full title *Die A.Z.*, formerly *Norddeutsche A.Z.*, a Ger. newspaper of world-wide reputation, was founded at Stuttgart in 1798 by the famous publisher, Johann Friedrich Cotta, in succession to his Tübingen venture, the *Neueste Weltkunde*, which had been suppressed by the authorities. On incurring the displeasure of the Duke of Württemberg in 1803 the paper transferred its headquarters to Ulm, and subsequently, in 1810, on that tn. becoming incorporated in Württemberg, to Augsburg. Here it first obtained wide influence and recognition, and gained the support of many distinguished statesmen and thinkers, while it recruited its contributors from the best talent of the time. In 1882 it was transferred to Munich, where it is now pub. weekly. In later years it hardly maintained its former prestige. In its opinions it is Liberal, in the German sense of the word. Until the revolution following the Great War it was the semi-official organ of the Ger. gov., and as such, contained full reports of ministerial speeches in the Reichstag and in the Prussian Landtag, official *démentis*, and 'inspired' articles. In 1920 it was sold to Hugo Stinnes. Not much read by the general public, it circulates mainly among newspaper editors and officials. A notable feature is the scientific supplement, *Internationale Wochenschrift für Wissenschaft, Kunst und Technik*. Successors to the first ed., L. F. Huber (1798–1804), have been Karl Stegmann (1804–37), G. Kolb (1837–63), A. Altenhöfer (1863–69), Otto Braun (1869–89), Hugo Jacobi (1890–91), Alfred Dove (1892), C. Petzet (1893–96), J. Jolly (1897–98), and Karl Mühling (1898–99). *See* Heyck's *Die Allgemeine Zeitung*, 1798–1898, Munich, 1898.

Allia, also spelt **Alia**, is a small trib. on the l. b. of the Tiber, about 11 m. N. of Rome. Here the Romans were defeated by the Gauls in July 390 B.C.

Alliaceous Plants are those which belong to the *Allium* genus (*q.v.*), are simply onion-like plants. The inflorescence is umbellate, and the various species have tunicated bulbs, or swollen underground buds, which are cultivated for culinary purposes.

Alliance, Holy, *see* ALEXANDER, EMPEROR OF RUSSIA.

Alliance is a union between nations or govs. formed by treaty, league, or agreement. Some definite aim, pointed out clearly in the agreement, has generally been the cause of an A. Thus in 1688 the Triple A. between Great Britain, Sweden, and the Netherlands had as its object the diminution of the power of Louis XIV. The Grand A. of 1689 was formed also for the same object. The Quadruple

A. of 1814 between Great Britain, Austria, Russia, and Prussia was directed against Napoleon and his dynasty, and to keep back France within her boundaries. The object of the Triple A. of 1882 between Germany, Austria, and Italy was the preservation of European peace against any possible aggressive action of Russia or France. This led to the Dual A. of France and Russia, having as its object mutual help in case of any hostile action on the part of the afore-mentioned powers. Sev. attempts have been made to generalise the character of A. For example, the Holy A. of 1815 was an attempt to find in the teaching of the Gospels a common basis of a general league of the European govs., having as its object the preservation of peace. One of the most important As. of modern times was the offensive and defensive A. effected between Great Britain and Japan in 1902 and modified in 1905. The terms of this A. were published to the world. It terminated in 1921 as a result of the Washington Conference. On the outbreak of the Great War the Triple A. broke up owing to the refusal of Italy to act with Germany and Austria-Hungary. This removed from France a potential enemy in her rear whilst facing Germany and allowed her to concentrate her forces. Italy entered the War on the side of the Entente in the spring of 1915, which in some measure counterbalanced the ineffectiveness of Russia.

The Triple Entente, or informal A., before the Great War embraced Great Britain, France, and Russia, and was concluded in 1907. Although at this time a formal A. existed between France and Russia, there was no binding agreement between the three powers to take a common course should one be engaged in war. In order to strengthen this bond and to have a clear understanding on the matter, the three powers signed the Pact of London on Sept. 5, 1914, each declaring that it would not conclude a separate peace or demand terms at the eventual peace conference without consulting the others. Japan signed the pact in Oct. 1914. When the Bolsheviks secured control in Russia they concluded a separate peace with the Central Powers in March 1918 and broke up the Triple Entente. Great Britain's only A. now is with Portugal; U.S.A. has no A. with any country. The Locarno Treaties (1925) between Great Britain, Germany, France, Italy, Belgium, Czecho-Slovakia, and Poland contain mutual obligations designed to prevent wars of aggression among the signatories and to a limited extent constitute an A. or series of As. (*See* LOCARNO TREATIES.)

Alliance, a city of Stark co., Ohio, U.S.A. *Manufs.* iron and steel goods, organs. Pop. 23,047.

Alliaria officinalis, or the *Sisymbrium alliaria*, commonly known as garlic-mustard, sauce-alone, or Jack-in-the-hedge, is a well-known cruciferous plant indigenous to Great Britain and many other parts of the globe.

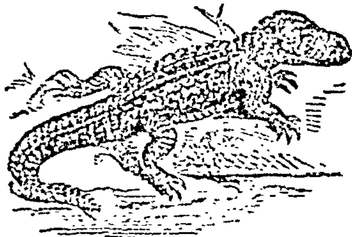
Allibone, Samuel Austin (1816–89), American author, *b.* at Philadelphia, Pa. His chief study was in bibliographical research, and he studied American and British literature. Became librarian of Lenox Library, New York City, in 1879. Died at Lucerne. Pub. three anthologies, and a critical dictionary of Eng. literature, which is still of great service.

Allier, riv. of Central France, flowing into the Loire. Rises in the Margerède Mts. in Lozère. Moulins is the chief tn. on its banks. It is the boundary line between Cher and Nièvre.

Allier, a dept. of Central France. Is a hilly and wooded dist. especially in S.E. Drained by the Allier, Loire, and Cher. Cereals grown and exported. Minerals in abundance. Area 2849 sq. m.; pop. 372,523.

Allies, Thomas William (1813–1903), Eng. historical writer, *b.* near Bristol. Became a fellow of Wadham College, Oxford, in 1833. In 1850 became a Roman Catholic, after resigning the living of Taunton, 1853–90. Secretary of Catholic Poor Schools Committee. Wrote several books on Roman Catholicism.

Alligator (Sp. *el lagarto*, the lizard), of family Crocodilidæ and order Eusuchia, is a reptile of which there are only two living species, *A. lucius*, in the Mississippi and other



ALLIGATOR

large rivers of America, and *A. sinensis*, in the Yang-tse-kiang. It differs from the caiman (*q.v.*) by having a bony septum between its nostrils, and its ventral scutes are thinly, if at all, ossified; it differs from the crocodile (*q.v.*) by having a broad head, de-

pressed and obtuse muzzle, unequal teeth, the fourth from the front on each side of the lower jaw being elongated and fitting into a cavity in the upper jaw when the mouth is closed, the hinder limbs lack a fringe of acute scales, and the toes are only slightly webbed. It is a carnivorous and piscivorous animal, and will devour dogs or pigs, but seldom attacks man unless molested. The strong tail by its lashing movement assists it in swimming, during which exercise it emits a loud bellowing. The eggs are deposited in layers in sand, and incubation covers a period of about three months. The female A. is a tender mother, providing food for her young and guarding them from their many foes, such as large fish and turtles. The skin of the A. is a valuable object of commerce, used in the manufacture of purses, cigarette-cases, and other articles, and the teeth are sold for ivory. From the Upper Cretaceous to the Pliocene period these animals ranged Northern Europe.

Alligator Apple, or *Anona palustris*, is a compound fruit of the genus *Anona (q.v.)*, and is closely related to the custard-apple.

Alligator Fish, the *Podothecus* of the family Agonidæ, and order Teleostei. It is a small fish of the cold seas, and its body is covered with bony plates. *P. acipenserinus* inhabits the Pacific Ocean.

Alligator Lizard, a name applied to sev. species of Sceloporus, family Iguanidæ of the Lacertilia. The scales are flat and the heads are not spiny; they are viviparous. They are found chiefly in S. America.

Alligator Pear, *see* AVOCADO PEAR.

), a naval A. took a prominent part in the Royalist struggles. He was sent as commander-in-chief to the Mediterranean, where he captured sev. Dutch men-of-war. He brought the Barbary States to subjection in 1669. In 1670 he was controller of the navy, and in 1678 was commander-in-chief in the Channel. His life throughout was one of stirring sea adventure.

Allingham, William (1824–89), a poet. He was *b.* at Ballyshannon, Donegal, Ireland, and worked in

pub. a book of poems, and in 1855 his *Day and Night Songs*. Married Helen Paterson in 1874. Wrote *Laurence Bloomfield*, a narrative poem dealing with Irish social questions. His wife, Helen Paterson (1848–1926), was well known for her painting, and Royal Society Colours. She D. Radford, *Diary*.

(1829–1908), American statesman, *b.* at Perry, Ohio; practised law in Ohio until 1857 when he went to Dubuque, Ia.; during the civil war he helped to organise the Iowa volunteers. He served in the House of Representatives, 1863–71; and in 1873 was elected to the U.S. Senate. He declined offer of Secretaryship of the Treasury; he sat on the Senate committees of finance and appropriations.

Alliteration is the term used to signify the frequent recurrence in composition of words commencing with the same letter, or with the same vowel or consonantal sound. 'When to the Sessions I summon up speare) is an is the fanciful is *not* a *knig* sonantal sound 'n' is repeated. The use of A. as rose *and poetic* , un-known to L but it is in the Celtic, Teutonic, and Finnish-Hungarian tongues that A. has flourished most. Indeed it is not too much to say that A. is one of the distingui and, jud siderable much use theless b writers, sages. Bunyan's great allegory, *The Pilgri* opens with the fine ; I walked thro this world,' and Cæsar, to give a modern example, when apostrophising the Sphinx, uses this striking alliterative passage: 'I wander, and you sit still; I work and wonder, you watch, and wait; I look up and am dazzled, look down and am darkened, look round and am puzzled. . . .'

A. bulks large in A.-S. and early Eng. poetry, where it precedes the use of rhyme. A common form of it was in couplets, where the first two words of the first line and the first word of the second all began with the same letter. *Piers Plowman* of Langland, a fourteenth-century poet, is a long poem, written entirely in alliterative verse. With the rise of rhyme the use of A. receded, and most of the great Elizabethan writers were severe critics of its injudicious use. The satirist Churchill ridiculed and at the same time exemplified A. in his well-known line about 'apt alliteration's artful aid.' But 'aptly' used, as it

has been by poetic giants like Shakespeare and Coleridge, it has taken a firm hold on the affections of the Eng. people, and has greatly enriched our literature.

Allman: 1. George James (1812–98), a distinguished botanist and zoologist and professor of botany in Trinity College, Dublin. He wrote *A Monograph of the Freshwater Polyzoa* and *A Monograph of the Gymnoblastic Hydroids*. 2. A son of (1) and of the same name; was *b.* in 1824. He became professor of mathematics in Queen's College, Galway, in 1853. His chief work is his *History of Greek Geometry from Thales to Euclid*.

Allmers, Hermann, Ger. poet and artist, *b.* in 1821 at Rechtenfleth, near Bremen. His first publication was *Marschenbuch*, a study of Frisian peasant life. His best work is perhaps his tragedy *Electra*. Others are *Dichtungen* and *Römische Schlendertage*.

Alloa, seaport and county tn. of Clackmannanshire, Scotland, on the Forth, 6 m. E. of Stirling; has breweries, distilleries, glass-works, woollen manufactures, etc.

Allobroges, an anct. Gallic tribe, occupying the land between the Rhone and Iser, now Savoy and Dauphiné. Their chief cities were Vienna (modern Vienne), Genova (modern Geneva), and Cularo (modern Grenoble).

Allocution (Lat. *allocutio*, a speaking to), a term denoting the formal address given by the pope to the College of Cardinals on any matter of ecclesiastical or political moment, and affixed to the door of St. Peter's.

Allodium, or Allodial tenure, is a legal term used to signify land which is the absolute property of its owner, free from any feudal tenure or obligation to a superior. Since the Norman Conquest there has been no allodial land in England, for the laws declare all land to be the property of the king. Before the Conquest the right was held to a certain extent, and it was common throughout the rest of Northern Europe. In Scots law the term is applied to movable property, crown and ecclesiastical property, and land bought under the Scots Lands Clauses Consolidation Act. The term is also to be found in the Udal rights of the Orkney and Shetland Islands.

Allogamy (Gk. ἄλλος, other, and γάμος, marriage), or cross fertilisation, the transference of the pollen of one flower to the pistil of another. There are two types—(1) Geitonogamy, in which the fertilised flower is on the same plant; (2) Xenogamy, in which it is on another plant.

Allopathy, usually applied to the orthodox method of therapeutics as opposed to homœopathy. Hahnemann, the inventor of the term and the promulgator of homœopathy, designated as A. that method of the treatment of disease consisting in the use of medicines the action of which upon the body in health produces morbid phenomena different from those of the disease treated. Homœopathy, on the other hand, consisted in the use of medicines which, by experiment on persons in a state of health, are known to produce morbid phenomena *similar* to those of the disease treated.

Allophane (Gk. ἄλλος, other, φαίνειν, to appear), a hydrous aluminium silicate of blue, green, or brown colour, found in Saalfeld in Thuringia and Schneeburg in Saxony.

Allori, Cristofano (1577–1621), son of the painter Alessandro Allori of the Florentine school, was himself a painter. He studied under Pagani, one of the greatest colourists of the time. His most celebrated work is 'Judith with the Head of Holofernes' in the Pitti Palace, Florence. His works are distinguished by delicacy, rich colouring, and technical accuracy.

Allotments are small plots of ground let to labourers—generally agric.—with the intention that they shall be cultivated by them in their spare time, and for their own benefit. 'A time there was ere England's griefs began, When every rood of ground maintained its man,' sings the poet Goldsmith, but that time began to decline in the fifteenth century, and continued till at the present day the great mass of the people are divorced from the land, and even those still engaged in agriculture work only as the hirelings of large landowners. In the spacious days before the rise of modern industrialism and before the numerous Inclosure Acts of the seventeenth, eighteenth, and nineteenth centuries, each cottager had his own small parcel of land which he cultivated, and in addition he had the right of turning his cattle, swine, and geese out to graze on the common land. The Georgian parls., consisting mainly of the representatives of the landed class, passed Inclosure Act after Inclosure Act, inclosing as much as 7,000,000 ac. of common land between 1760 and 1867. To compensate the cottagers for their lost grazing rights many of these Acts provided that garden As. should be reserved for them. This benevolent intention seems to have failed in the working, for while between 1845 and 1867 nearly half a million ac. of land were inclosed, only 2119 ac. were set aside for the poor. Alarmed by the rapid decline in the agric. pop. due to the lure of the tns., with their greater

opportunities, higher wages, and less monotonous existence, the policy of the nineteenth century has been to check the flow towards the tns. by giving the agric. labourer some inducement to remain in the country, so that Acts for the provision of As. and small-holdings were almost as numerous as Inclosure Acts in the previous century. Incidentally it was also discovered that the parcelling of land into small-holdings was a profitable thing for the landlord, the fork and spade husbandry of the A. being much more effective than the plough. In 1819 and 1831 were passed the first Acts making provision for As., and the series of Acts which followed were consolidated in the Small Holdings and Allotments Act, 1908. Most of these Acts aimed at giving compulsory powers to local authorities, and in some cases laid on them the duty, to provide As. The Parish Councils Act, 1894, gave a stimulus to this matter, and during the first four years of its working nearly 15,000 ac. were allotted by the councils to 32,000 tenants. An A. does not generally exceed in size a quarter of an ac., the underlying idea being that its size should not exceed that which can be cultivated during the spare time of the labourer, but a small-holding is the term applied to an agric. holding of from 1 to 50 ac. Additional powers have been conferred on local authorities by various Acts passed since the War. Under the A. Act of 1919 a County Council may acquire land for leasing to a Parish Council for A., but the A., may only be let to residents or to persons working on a co-operative system, or they may be let to A. Associations. Statutory powers are also given to local authorities to acquire land compulsorily for A., or, with the consent of the Ministry of Agriculture, land held by them for other purposes may be appropriated to A. Under the Act of 1925 the Public Works Loans Commissioners may lend to any 'approved society' (i.e. a society registered under the Indust. and Provid. Soc. Acts or under the Friendly Soc. Acts) money to purchase land for A. Compensation for improvements is provided for by the A. Act of 1922, and, in this context, an 'allotment' means any piece of land, whether attached to a cottage or not, of not more than 2 ac., held by a tenant and cultivated as a farm or a garden or as both. For purposes of the Act of 1925 an 'allotment' includes any piece of land of not more than 5 ac. Every local authority preparing a town-planning scheme must consider what provision ought to be made for reserving land for A. (including allotment gardens, *i.e.* A. not exceeding 40 poles and wholly or mainly under crops or vegetables for consumption by the cultivator or his family) and must at least once a year consider whether any and if so what lands within the area of the scheme are needed for A. (Act of 1925). By the Act of 1925 a borough or an Urban Dist. Council may acquire land for future A. with the approval of the Ministry of Agriculture.

Allotropy, the property which some chemical elements possess of existing in different modifications under different circumstances. Sulphur may exist as octahedral or prismatic crystals, or as an amorphous powder, or yet again in a plastic form. Carbon may exist in either of the three forms, diamond, graphite, and amorphous charcoal or lamp-black. Phosphorus may exist in red, yellow or scarlet crystalline modifications. Oxygen is found as the ordinary constituent of air or as the ozone which is produced in the neighbourhood of an electric discharge. In this case, however, it is known that the combination of atoms in the molecule is different, as ozone is one and a half times as dense as oxygen; that is, the formula for oxygen is O_2 and that of ozone O_3. A. is not confined to non-metals; thus tin, silver, antimony, arsenic, and other metallic or metalloid elements exist in allotropic forms. A. is explicable on the assumption that the molecules of the different forms are of dissimilar structure.

Alloway, on the banks of Doon, 2½ m. S. of Ayr, in the co. of Ayrshire, Scotland, is the birthplace of Robert Burns. The cottage in which the poet was *b.* has now been converted into a museum. Here also is the 'Kirk' which he celebrates in *Tam o' Shanter* as the scene of the witches' dance, and the 'Auld Brig' over which Tam o' Shanter escaped.

Alloxan ($C_4H_2O_4N_2$), or mesoxalyl-urea, an important decomposition product of uric acid. It is obtained by oxidising the uric acid with nitric acid. On treatment with alkalis it takes up two molecules of water, producing urea and mesoxalic acid.

Alloxantin, a substance formed by the reduction of alloxan by dialuric acid, or directly from uric acid by evaporating to dryness with nitric acid. Treated with ammonia, it forms a purplish-red dye, *murexide*, a test for uric acid being thus provided.

Alloy, a substance formed by the union of two or more metals. There are three ways of bringing about this union. The first is the compression of the powdered metals in a steel

cylinder, but this does not lend itself to technical application. It is also possible to bring about the deposition of an A. by the electrolysis of a solution of a mixture of two metallic salts. The third method, that of the greatest commercial importance, is the fusion of the metals at a temp. high enough to form a uniform liquid. The observation of the temps. during the process of cooling has shown that at certain points the temp. remains constant for a short time, which seems to point to chemical combination taking place at those temps. Some As. therefore may be chemical compounds, definite proportions of the constituents occurring in each molecule, but the great majority of As. are certainly not in a state of chemical combination. Roberts-Austen has shown that metals diffuse in other metals just as a salt dissolves in a liquid, and sometimes at a greater rate. Thus a ball of gold immersed in a bath of molten lead at 550° quickly diffuses into every part of the liquid. These phenomena, combined with the fact that all proportions of the metals may exist within certain limits, have suggested that an A. is analogous to a solution. The microscopic examination of As., however, shows that the different metals arrange themselves in patterns often of a most varied character, but that each metal is quite distinguishable.

Certain physical properties of an A. appear to be a mean of the corresponding properties of its constituents, while other properties are markedly different. The melting point is usually lower than that of any of its components. This is seen in ordinary plumber's solder, consisting of tin and lead, which melts more easily than either of the metals composing it. Rose's fusible metal, consisting of one part of tin, one of lead, and two of bismuth, melts at 95°, although the lowest melting-point among its constituents is that of tin, viz. 232°.

Many of the As. are used in the arts and manufs. on account of the properties they possess which are wanting in the simple metals. Brass consists of two parts of copper and one of zinc, is hard and yet can be easily turned. Gun-metal contains nine parts of copper to one of tin and is very tough and hard. Bell-metal contains two parts of tin to eight of copper, and is harder and more sonorous than either of its constituents. Type-metal consists of sixty-five parts lead, twenty-five parts antimony, and ten parts tin, is hard but not brittle and is easily fusible. Bullets are covered with a hard envelope consisting of an A. of nickel and copper. An A. of 36 per cent. of nickel in steel maintains a practically constant volume through a great range of temp., and one of 45 per cent. of nickel in steel possesses the same coefficient of expansion as glass, and therefore can be used instead of platinum for electrical connections through glass. A small quantity (up to 12 per cent.) of tungsten alloyed with steel produces an exceedingly hard metal, used for making tools intended for cutting or planing steel.

Allport, Sir James Joseph (1811–92), manager of the Midland Railway. This route from London to Carlisle he made continuous and organised under one management, uniting the various local railways on the line. He also in 1877 made third class take the place of a second.

Allspice, the dried flower-buds of *Eugenia caryophyllata* (*q.v.*).

Allston, Washington (1779–1843), American painter and author, was *b.* at his father's plantation at Waccamaw, S. Carolina. In 1800 he graduated at Harvard, after which he visited London, Paris, and Rome (where he formed friendships with Coleridge and Thorwaldsen), for the purpose of studying art. In 1818 he finally returned to America. His pictures are numerous, the best known being 'The Dead Man Revived,' 'St. Peter liberated by the Angel,' and his unfinished 'Belshazzar's Feast.' He pub. a poem, *The Sylphs of the Season*, a novel, *Monaldi*, and *Lectures on Art*. See J. B. Flagg's *Life and Letters of Washington Allston* (New York, 1892).

All the Talents, the ministry organised by Lord Grenville in 1806, on the death of William Pitt, and so named in derision by the opposition party.

All the Year Round, a weekly periodical, of which Charles Dickens was ed. and which superseded *Household Words*. In it his *Tale of Two Cities* first appeared.

Alluvion (Lat. *alluvio*, a washing against), the legal term for land gradually formed by deposit from the sea or some other water. The process must be gradual. A. becomes the property of the owner of the land to which it is attached.

Alluvium (Lat. *ad*, towards, *luere*, to wash), or **Alluvial Deposits**, a name given to those accumulations of sand, earth, and loose stones or gravel brought down by streams and rivers and spread out over lower lands, which are called *alluvial lands*. The term is sometimes also applied to the deposits at the mouth of a riv. entering the sea, when they are known as *marine alluvia* to distinguish them from the *fresh-water alluvia*.

Allygurh, see ALIGARH.

Allyl, an unsaturated organic radicle corresponding to the formula $CH_2{:}CH{\cdot}CH_2$. The chief compounds are: *A. alcohol*, with the general properties of a primary alcohol; *A. iodide*, a colourless liquid with an odour of garlic; *A. bromide*, a heavy liquid obtained by treating A. alcohol with phosphorus tribromide; *A. sulphide*, or 'oil of garlic,' obtained by macerating garlic; and *A. isothiocyanate*, or 'oil of mustard,' occurring in black mustard seeds.

Alma, a small riv. of Russia, in the Crimea, flowing westward into the Black Sea. On its banks the combined armies of Britain, France, and Turkey defeated the Russians, Sept. 20, 1854.

Almacantar, *see* ALMUCANTAR.

Almack's, in the eighteenth century the name of a famous club and suite of assembly rooms, founded about 1764 by one McCall, a Scotchman, of whose name A. is an anagram. The club was noted for its aristocratic exclusiveness and high play, and was situated in Pall Mall. From it sprang the still existing Brooks's Club. In 1765 McCall built a suite of assembly rooms in King Street, St. James's, and here balls of still greater exclusiveness were held for some years. In 1781, at McCall's death, they became the property of his niece, Mrs. Willis, and continued as 'Willis's Rooms' till 1890.

Almada, a tn. of Portugal in Estramadura, on the Tagus. Wine trade. Pop. 11,580.

Almaden, a tn. of Spain, prov. of Ciudad Real, in mountainous country 55 m. S.W. of Ciudad Real, is celebrated for its mercury mines, the most ancient in the world. Pop. 9850.

Almagest, name of an important astronomical and mathematical work f Claudius Ptolemæus, or Ptolemy, ne of the most celebrated savants of ie Alexandrian school. This work as probably written between A.D. 10 and 150, in the reign of the Rom. mperor Antoninus Pius, and was vided into thirteen sections or ooks.' To distinguish it from other portant works of the same author, ceived the Gk. appellation *megiste*, ie greatest,' from which its modern ne, with the addition of the Arabic nite article *al*, 'the,' is derived. it is set forth the theory of the r system, designated the Ptole- c system, which held the un- llenged sway in the realm of onomic science during the Middle s that the works of Aristotle did other branches of knowledge. rding to this system the sun ved around the earth, but the planets revolved around the The A. contained also a catalogue of 1028 stars.

Almagra (Arabic), a species of ochr of a dark red colour used as a skin paint and general dye.

Almagro, city of La Mancha, Spain, prov. of Ciudad Real. Situated in a vine-growing dist., where lace-making is also pursued. Famous for its red wine. Brandy, soap, and earthenware are manufactured. Pop. 8700.

Almagro, Diego de (1475–1538), a Sp. soldier of fortune, said to have been a foundling in the vil. of A. In 1524 he joined Pizarro in a scheme for the conquest of Peru. Ultimately the two quarrelled over some territory, and in 1538 Pizarro had him executed. His son bore the same name.

Almain, a word derived from the Alemanni, a people of anct. Gaul, and used to denote Germany. The Fr. words Allemand and Allemagne are derived from the same source.

Almali, or **Elmalu**, a tn. of Asia Minor on the R. Myra, 25 m. from its entrance into the Mediterranean. It is beautifully placed in a valley of the Massacytus Mts., and has a very considerable trade. Pop. about 20,000.

Alma Mater (Lat., nourishing mother), the name given to a university to express its relation to those educated at it—its *alumni* or foster-children.

Almamun, or **Abdullah III.**, a calif of the Abbaside dynasty, was the son of Haroun-al Raschid. After a war with his brother Amin, he came to the throne in 813. He rendered his reign illustrious by his encouragement of science and the arts, by his generosity and clemency, and by his own taste for letters. He established colleges, and caused the best works of other countries to be translated into Arabic. Especially did he encourage astronomy, causing a degree of the meridian to be measured on the plains of Shinar. He *d.* in 833 in a campaign against the Gk. Emperor Theophilus.

Almanac, a book or table containing a calendar of the days, weeks, and months of the year, with the addition of notices of astronomical phenomena, of ecclesiastical feasts, and similar useful information. Authoritative As. are pub. by the govs. in most countries, and from these the smaller ones are compiled. Such are the *Nautical A.* in Great Britain; the *American Ephemeris and Nautical A.* in the U.S.; and the *Almanach de Gotha*, pub. in Germany and France. The Berlin *Astronomisches Jahrbuch* and the Fr. *Connaissance des Temps* contain additional astronomical information. These works are pub. some years in advance, and contain tables of the predicted positions of

sun, moon, and planets, and of all the fixed stars used in navigation. Statistics of various kinds are also given. The *Almanach de Gotha* contains lists of the statistics of politics, population, sovereigns, army, etc., for every state. More popular works are *Whitaker's* in England, containing a solid mass of information. *Oliver and Boyd's New Edinburgh A.* in Scotland, and Thom's *Irish A.* for Ireland.

The history of the A. goes far back in the E. Its use is known of from the thirteenth century onward in England. The first printed A. is that of Purbach, 1450–61, and this was soon followed by the more important work of Regiomontanus, which covered the years from 1475 to 1531. The early As. generally took the name of 'Prognostications,' and these prophetic As. had a huge circulation among the unlearned. In the reign of James I. the monopoly for their production was granted to the two universities and the Stationers' Company. Of this type of publication are *Old Moore's* and, in America, *Poor Richard's A.* The sale of such works of fiction is now considerably restricted. Partridge, the A. maker of the Stationers' Company, has been immortalised by Dean Swift in the famous *Bickerstaff Papers*, 1708.

Almansa, a tn. of Murcia, Spain, prov. of Albacete, on Madrid-Alicante railway, has linen, cotton, brandy, and soap manufs. Near this tn. the Fr. under the Duke of Berwick defeated the British and Sp. troops on April 25, 1707. Pop. 11,887.

Almansur (Arabic, the Victorious), **Abu Jaffar Abdallah** (712–775), second calif of the Abbaside dynasty, succeeded his brother in 754. He founded Bagdad.

Alma-Tadema, Sir Lawrence, O.M. (1836–1912), of Dutch extraction, was *b.* at Dronryp, Friesland, on Jan. 8. He studied painting first at the Antwerp Academy, and later under Baron Leys. He followed Leys in devoting himself to the reconstruction of the past, painting chiefly classical subjects. About 1870 he settled in London and became a naturalised Englishman. In 1879 he was made a member of the Royal Academy, and he received knighthood in 1899. His work is remarkable for its archæological accuracy and for his extraordinary power of painting marble. Some of his works are: 'The Children of Clothilde,' 1861; 'Pyrrhic Dance,' 1869; 'Vintage Festival,' 1870; 'Seasons,' 1877; 'Roses of Heliogabalus,' 1888. He had the distinction of being one of the artists selected for the Order of Merit. *See* H. Zimmern, *L. Alma-Tadema, His Life and Work* (London, 1886; G. Ebers, *L. Alma-Tadema* (trans. New York, 1886).

Alme, Almeh, or Al-mai, *i.e.* 'the learned,' is the name given by the modern Egyptians and Arabs to the Egyptian singing and dancing girls who attend festivals, marriages, funerals, and other ceremonies. They are also found in Syria and other parts of the Ottoman empire.

Almeida, a tn. in Portugal, prov. of Beira, near the R. Coa, formerly one of the prin. fortresses of Portugal. In 1762 it was taken by the Spaniards, in 1810 by the Fr. Recovered by the British, 1811. Pop. 2300.

Almeida, Emanuel (1580–1646), a Portuguese Jesuit, for many years resident at the Abyssinian court. His *Historia General de Ethiopia a Alta* contains much valuable information.

Almeida, Francisco d' (*c.* 1450–1510), first viceroy of the Portuguese Indies, son of the Count of Abrantes. For his services against the Moors, Emmanuel I. made him viceroy of India, 1505. He built many forts, and, with his son Lorenzo, made considerable explorations. His son having been killed (1507) in a conflict with the Egyptians, he was planning vengeance when Albuquerque was sent out to supplant him. He refused to resign until, in 1508, he completely defeated the Egyptians in a naval battle off Diu. He then gave way. On his journey home he was slain by natives at the Cape of Good Hope, the fleet having stopped at Saldanha Bay, March 1, 1510.

Almeida, Garret Jean Baptiste d' (1799–1854), Portuguese poet and politician, *b.* at Oporto. He took an active part in the political movements of his country. Of his romantic plays *Gil Vicente* is considered the best national drama of Portugal. His other works include an epic poem called *Dona Branca*, *Romanceiro*, a collection of Portuguese folk-tales, and *Folhas Cahidas*, a volume of lyrics.

Almeida, Nicolão Tolentino d' (1741–1811), a Portuguese poet who wrote the *Obras Poeticas*. His vein is satiric.

Almeirim, a tn. of Portugal in the dist. of Santarem, an anct. residence of the kings of Portugal. Pop. 6900.

Almelo, a tn. of Holland on the Vecht, near Deventer. It has linen industries. Pop. about 27,700.

Almendralejo, a tn. of Spain in the prov. of Badajoz. Vines and olives are cultivated in its vicinity. Pop. 15,448.

Almeria: 1. Prov. of Spain, E. part of former kingdom of Granada. It is mountainous, with much mineral wealth. Area 3360 sq. m. Pop. 339,400. 2. Cap. of above prov.,

Mediterranean port 104 m. E. of Malaga, has good harbour defended by forts. It is an anct. city, very Saracenic in appearance. Exports fruit of various kinds, iron-ore, lead, etc. Pop. 50,000.

Almissa, a dist. of Yugo-Slavia. The grape is the chief product of the country. Pirates formerly infested the coast. Pop. about 4400.

Almodovar del Campo, tn. of New Castile, Spain, prov. of Ciudad Real, centre of agric. dist., once a Moorish fortress. Pop. 12,635.

Almogia, a tn. of Spain in the prov. of Malaga, with about 8000 inhab. Vines, figs, raisins, and other fruits are plentiful.

Almohades, a Berber dynasty that ruled N. Africa and the Moslem half of Spain during the twelfth and thirteenth centuries. The founder of the dynasty and the cult (the name, lit. *Al-muwahhidun*, means Unitarians—those laying particular stress on the unity of God, as opposed to the current anthropomorphism) was Mohammed ibn Tumart. He, with his lieutenant and successor, Abd-el-Mumin, dethroned the Almoravide dynasty (*q.v.*) and conquered N. Africa. The dynasty was fanatical and purely military, yet it retained its power intact until 1212, when its decline began in the defeat of Navas de Tolosa. The line ended in 1269.

Almon, the name of an affluent of the Tiber in anct. Latium, where those who sacrificed to Cybele purified themselves, and where every year the image of the goddess was laved.

Almon, John (1737–1805), a London bookseller and writer, was *b.* at Liverpool. His business premises were in Piccadilly. Among his publications were the *Parliamentary Register*, 1774, and the *General Advertiser*, 1784. He reprinted the pamphlet of Junius, but was fined on account of it. His great friend was John Wilkes, whose correspondence he published.

Almond is a name applied to sev. plants of different orders. The common A. is a species of *Prunus* (subgenus *Amygdalus*), and is known as *A. communis* or *P. Amygdalus*; it is grown in England for its pink flowers. It yields an oil, and the seeds are eaten as dessert. The country A. is *Terminalia Catappa*, and the Java A. is *Canarium commune*; both yield resin, but belong to different orders.

Almondbury, a vil. and parish of the W. Riding of Yorkshire, near Huddersfield, and 35 m. S.W. of York. It has cotton and woollen mills. Pop. 15,637.

Almonds, Oil of, a substance squeezed out of the kernels of the A. tree. That produced from sweet As. contains a fixed oil, a glyceryl oleate, which is often used as a substitute for olive oil. Oil of bitter As. contains amygdalin, which in contact with water gradually undergoes decomposition into benzaldehyde, hydrocyanic acid, and dextrose. Benzaldehyde is often called 'oil of bitter As.,' and is used for flavouring purposes and in the manuf. of various dyes.

Almoner (O.Fr. *almosnier*, Lat. *eleemosynarius*), originally the officer of a religious house appointed to distribute to the poor the alms of the house, one-tenth of the revenue. Bishops and sovereigns had also As. In England the lord high A., usually a bishop, distributes, twice a year, the sovereign's bounty.

Almonte, a tn. in the prov. of Ontario, Canada, and a centre for the manuf. of woollen goods. Pop. 2426.

Almora, tn. and dist. of the N.W. Provs. of India, Kumaon div. The tn., situated more than 5000 ft. above sea-level, was taken by the British in 1815. In the dist. is a military sanatorium, where Europeans may retire during parts of the year. Pop. of tn. 8000.

Almoravides, a Berber dynasty which ruled over Morocco and part of Spain during the eleventh and twelfth centuries. The line was founded by Abdallah ibn Yaseen, who about 1050 preached a holy war. Aided by his brother Abu Bakr, he conquered most of Morocco. On his death he was succeeded by Yusuf ibn Tashfin, who completed the conquest of Morocco and extended his power into Spain in 1086. He defeated the Christians at Sacralias, but was then obliged to return to Africa. In 1090, however, he returned and took the complete control of Mohammedan Spain. The dynasty was supplanted in 1147 by the Almohades (*q.v.*).

Almqvist, Karl Jonas Ludwig (1793–1866), Swedish author, was *b.* at Stockholm and *d.* at Bremen. He gave up good prospects to found a 'natural life' community in Wermland. He soon relinquished this plan and took to school-teaching. In 1832 his true literary career began with the first of his series of romances, called *The Book of the Thorn-Rose*. His succeeding works, lyrics, dramas, philosophical, æsthetic, moral, and educational works, show remarkable versatility. In 1851 he fled to America, convicted of forgery and charged with murder. Later he returned to Bremen, where he lived under the name of C. Westermann till his death.

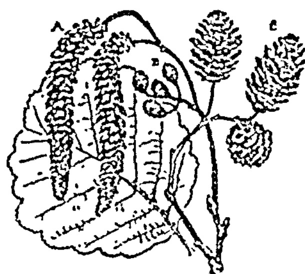
Almshouse, a house built and endowed for the support of those disabled from work by age or poverty.

The most anct. example is the hospital of St. Cross, Winchester. The name 'hospital' is also used for As. in Scotland. In 1853 charity commissioners were appointed to put down the many abuses of the system.

Almucantar, a scientific apparatus consisting of a telescope borne on a float in a tank of mercury. The path of the float is a horizontal circle passing through the pole of the heavens. Clock connections are made by calculating the different azimuths cut by the transits of the stars. The instrument also gives the ascensions and declinations of the heavenly bodies.

Almuñecar, seaport of Spain (Andalusia), prov. of Granada, on the Mediterranean, a quaint city with many Moorish remains; pop. 8030.

Alnus, a genus of plants of the order Betulaceæ which grow in a temperate climate. *A. glutinosa* is the common or black alder, so called from the very dark hue of its bark. It inhabits swamps and meadows of Europe, the N. of Africa, Asia, and America; it is extremely common in



CATKINS AND LEAF OF ALDER

A, male catkins; B, female catkins; C, female cones of previous year.

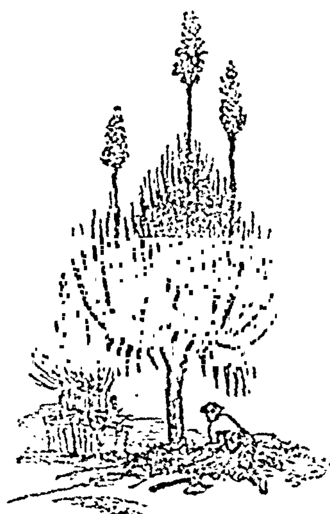
Britain. It is not a very large tree, varying in height from 30 to 60 ft. The leaves are a rough oval, with serrated, or toothed, edges, and the flowers form small female catkins resembling cones and pendulous male catkins. The bark is valuable for tanning, while the young shoots dye various colours, particularly red and brown. The tree is not of much value as firewood, but it furnishes an excellent charcoal, second only to that of the black dogwood. The wood is extremely useful, being capable of enduring long immersion in water, and next to metal is the best material for water-pipes and underground purposes. Cabinet-makers employ it in the manuf. of what is known as Scottish mahogany.

Other species of A. are *A. incana*, the Turkey or upland alder, which is found all over continental Europe, and is noted for its non-glutinous leaves; *A. cordifolia*, the heart-leaved alder, which is a native of Naples; and *A. viridis*, the green alder, an inhab. of Central America.

Alnwick, on the Alne, cap. of the co. of Northumberland, England, 32 m. N.W. of Newcastle. It is a well-built tn., and contains interesting remains, such as those of its old tn. wall and various abbeys. Pop. 6988.

"Alnwick Castle," The. A British steamer torpedoed by the Germans without warning on March 19, 1917, some 300 m. off the Scilly Isles. She was carrying a crew of 100, together with fourteen passengers and twenty-four of the crew of the transport *Trevose*, which had been torpedoed a few days previously. All her six boats were launched before the ship went down, the secret codebooks, admiralty mail, and sailing orders having been sunk to prevent capture. The boat sank in less than 15 minutes and the 139 survivors were left in open boats, 300 m. from land. Ultimately they were rescued by a Fr. steamer, five having perished from exposure and thirst.

Aloe, a genus of succulent shrubs or trees of the order *Liliaceæ*, natives of the Cape of Good Hope and the is.



ALOE

of Socotra. The best As. grow on the *A. socotrina*, from the fleshy leaves of which plant the drug is obtained.

Aloes, Medical Properties of. The drug known as As. is bitter in taste, and procured from the inspissated juice of the leaves of many species of

A. The finest sort, the Socotrine As., have their chief sources in *A. lucida* and *A. perryi*; the very coarse *A. caballina*, or horse As., are used only in veterinary practice. The chief principle of As. is aloin, which is a powerful cathartic, its chief action being on the rectum. It is also an emmenagogue and anthelmintic.

Aloes Wood, also known as Agila Wood, Agallochum, Eagle Wood, Paradise Wood, and Calambac, is the heart-wood of *Aquilaria ovata* and *A. agallocha* found in tropical Asia. The innermost wood of these trees yields a fragrant resinous substance which is used in the East as a perfume and as a medicine. It retains its fragrance for years, and was once more valuable than gold. It is thought to be the aloes mentioned in the Bible.

Aloidæ, Otus and Ephialtes, according to the anct. Gk. legend the twin sons of Poseidon and Iphimedia, wife of Aloeus. They made war upon the gods, and in order to force an entrance piled Mt. Pelion on Ossa. They were defeated by the immortals, and their fate became a standing warning to insolent mortals.

Aloin, a bitter drug obtained from aloes. The chemical formula is $C_{16}H_{16}O_7$. The concentrated juice of the aloe is used as an aperient and for other medical purposes.

Along, a magnificent bay in Annam, Indo-China, and offering a splendid shelter to ships. In the neighbourhood are famous coal-mines.

Alonso, *see* ALFONSO.

Alopecia (Gk. ἀλώπηξ, fox), the total or partial falling out of the hair, obtaining its name from the fact that foxes are subject to a disease which destroys their hair. The disease may attack the whole of the body, or merely a particular region; it has many causes, and is often hereditary. Lotions, keeping the hair short, and general attention to health are efficacious in its cure.

Alopecurus, a genus belonging to the Gramineæ, or grasses. *A. pratensis*, the meadow foxtail grass, grows abundantly in Britain, providing a rather coarse but valuable pasturage for cattle.

Alora, a tn. of Spain in the prov. of Malaga. It is the centre of a very fertile fruit-growing dist., and is famous for its 'Manzanilla Olives.' Its mineral springs are much frequented. At A. are some fine mediæval relics. Pop. about 11,450.

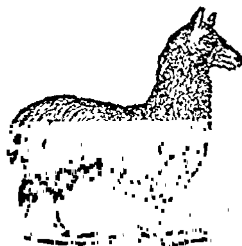
Alosa, or *Clupea alosa*, is the common shad found in Europe. It belongs to the fa[illegible] closely related [illegible] anchovies, and [illegible]

Alost, or Aalst, tn. of Belgium in E. Flanders, on the R. Dender, here made into a canal. It contains the church of St. Martin, and manufs. lace and textiles. Pop. about 32,000.

Aloysia, a genus of Verbenaceæ, common in America. The British lemon verbena is *A.* (or *Lippia*) *citriodora*.

Aloysius, St., *see* GONZAGA, LUIGI.

Alpaca, a domesticated breed of cameloid mammals, derived from the wild guanaco. It is smaller than the llama, and is not, like that animal, used as a beast of burden. As. are kept in large flocks in the Peruvian Andes, and their wool is shorn annually.



ALPACA

The wool varies in colour from black to dark yellow, and is lustrous, silky, and fine. It has been used by the Indians for cloth from time immemorial, but it was not properly introduced into England till 1836. The name of Sir Titus Salt is historic in its connection with the establishment of alpaca factories.

Alp Arslan (Valiant Lion), second Persian sultan of the Seljuk dynasty (1029–72). On embracing the Mohammedan faith, he took the name Mahommed ibn Daoud, to which his surname was afterwards added. His vizier, Nizam-al-Mulk, assisted him ably and founded many colleges throughout the kingdom. He came to the Persian throne in 1063, and pursued a career of conquest. He reduced Armenia and Georgia, and later won a great victory over the Emperor of Constantinople, Romanus Diogenes, whom he took prisoner, but treated with great generosity. The sultan was assassinated by a prisoner whom he had condemned to death.

Alpena, city of A. co., Michigan, U.S.A., on Thunder Bay, at the mouth of Thunder Bay R., on the Detroit and Mackinac railroad. The city is a summer resort, and has good fisheries and tanneries, besides exporting lumber. Pop. 11,101.

Alpenhorn, or Alphorn, musical instrument used chiefly by the Swiss mountaineers to convey signals. It consists of a curved wooden horn with cup-shaped mouthpiece. The notes

are the natural harmonics of the open tube.

Alpes, Basses, a dept. in the S.E. of France on It. frontier, bounded on the N. by Hautes-Alpes, on the E. by Italy and Alpes Maritimes, on the S. by Var. It is drained chiefly by the Durance and its tribs. The surface is generally sterile and mountainous, but the valleys are fertile. Chief tn. Digne. Area 2685 sq. m.; pop. 96,694.

Alpes, Hautes, a dept. in the S.E. of France, N. of Basses-Alpes. The dept. is mountainous throughout (chief peak Les Ecrins, 13,500 ft.), and is drained chiefly by the Durance. It is thickly wooded and has some mineral wealth. Cap., Gap. Area 2158 sq. m.; pop. 91,696.

Alpes Maritimes, a dept. in the S.E. of France, bounded on the S. by the Mediterranean and separated from Italy on the N. and E. by the Maritime Alps. It is watered by the Var and its tribs. The climate, salubrious throughout, is particularly mild in the S., where are the well-known health resorts of Nice (the cap.), Cannes, Mentone, and Antibes. The olive, orange, lemon, mulberry, and citron flourish, hence the silk and oil industries are considerable. Tobacco is also raised. Another source of income is the exportation of flowers to be used in the manufacture of perfumes. Area 1450 sq. m.; pop. Fr. 357,759, foreign 100,717.

Alph, the imaginary 'sacred river' where Coleridge's Kubla Khan built his stately pleasure dome. The poet places the riv. in Xanadu, a genuine district.

Alpha and Omega, written Α and Ω, first and last letters of the Gk. alphabet. God, as being the beginning and end of all things, calls Himself in the Bible Alpha and Omega. The words are applied in general to the sum total or true essence of a thing.

Alphabet, from *alpha* and *beta*, the first two letters of the Gk. A. An A. is a collection of symbols, intended to represent the various sounds used by the human voice in speech. Each of these is represented by a different sign, which varies somewhat according to whether it is written or printed, and is called a letter of the A. These letters are united to form words. Contractions for two or more letters are rarely employed to-day, but they are quite common in Gk. and Latin manuscripts. These alphabetic symbols are divided into vowels and consonants, the vowel sounds being those which give the necessary breathing to the consonantal ones, which cannot be pronounced without the aid of a vowel. Combinations of vowels are called diphthongs.

Perfection has not yet been reached by any A., although this end does not perhaps seem very difficult of achievement. A perfect A. would represent each sound by a single symbol, and not more than one sound by the same symbol. As it is, all As. omit symbols for some sounds, representing these, when necessary, by combinations of other symbols, while most of them contain redundant letters. To take examples from the familiar Eng. A. We have no single symbol to represent the sounds of *th* and *ch*, although both are found in the Gk. A. and the former in the A.-S. one. We therefore represent these sounds by uniting two symbols, or letters. On the other hand, *q* and *x* are redundant. *Qu* can always be represented by *kw* and *x* by *ks*. Again, the letter *c* is used for two distinct sounds, in addition to being employed in the formation of the combination *ch*. It is sounded hard as in *cross* and *corpse*, a sound which can also be represented by *k*, and soft as in *cerise* and *precise*, when the sound can also be represented by *s*. Similar instances can be found in other As.

Through the mutations of the A. during the long years of its existence, it is fairly easy to attach a constant permanent value to the various consonantal sounds, but it is otherwise with the vowel sounds. To-day the same vowel, *a* or *o* for example, indicates varying sounds, and it is almost impossible for us to know what sound was given to it and to the other vowels by anct. peoples. This difficulty will be appreciated more fully if we reflect that in England to-day the same vowel is pronounced very differently in different parts of the country: the Londoner finds it hard at times to understand the speech of Yorkshire or of Devon, and this is due rather to the varied methods of pronouncing the vowels than to those of pronouncing the consonants. These remarks infringe somewhat upon the domain of phonetics, but they are necessary in order to understand the history and formation of the A.

Alphabetic writing is now universally employed by civilised peoples, and the A. has had a long and interesting history. The earliest method of representing ideas and conveying them from one person to another, in a manner other than by speech, was doubtless the pictorial one. Early man drew rough sketches in order to convey his ideas to another. This method was succeeded in the course of time by a system of hieroglyphics in which figures of objects filled the place now occupied by conventional signs; by the cuneiform system of writing, in which each sound is represented by a wedge or combination of

wedges, and by other similar systems; the main, central idea being that a certain symbol represented a certain sound. The hieroglyphic system was used by the Egyptians, who, like some other early peoples, regarded writing as something sacrosanct, something to be hidden from the eyes of the vulgar, and the cuneiform one by the Babylonians and Assyrians. It is not difficult to believe that both systems exercised some influence upon the origin of the A., although the nature and amount of such influence is still a matter of controversy.

It is usually believed by scholars that practically all existing As. have a common origin, being descended from a Semitic one, although, as already mentioned, attempts have been made to give to them a definite Egyptian ancestry. The earliest documentary evidence known to us concerning the existence of an A. is the stone of Mesha, or the Moabite stone. This, discovered in 1868, and now in the Louvre in Paris, has on it an inscription describing the achievements of Mesha, King of Moab, who, according to 2 Kings iii. 4, 5, paid tribute to Solomon. It is thought to date from 1000 B.C. or thereabouts, and the inscription is in alphabetic characters. It is quite evident, however, that at this time alphabetic writing was not new; it was clearly in common use among the Moabites, and its origin must be antedated by several hundred years. There is in existence another alphabetic inscription, thought to date from about the same time, possibly a little earlier. This is on the fragment of a bronze bowl unearthed in Cyprus in 1876, and it states that the bowl was given by a servant of Hiram, king of the Sidonians, to the god Baal of Lebanon.

The known facts about the original Semitic A. may be summarised thus: It was used by the Semitic-speaking inhab. of Syria, and it originated some time between 1000 and 2000 B.C., being influenced to some extent by the system of hieroglyphic writing in vogue among the Egyptians some thousands of years B.C. It consisted of twenty-two letters, or symbols, hich correspond roughly to the first wenty-two letters of its descendant, ne Gk. A., and the method of writing as from right to left, not, as we rite to-day in the Western world, om left to right. We may mention at the hieroglyphic A. of the Egypns contained twenty-four letters. e twenty-two letters of this Semitic it is important to note, were all nsonants. It contained no vowels. e reason for this is not clear. Posy each letter represented, not a le sound, but a syllable; *i.e.* it was a consonant *and* a vowel. Ano explanation is that the vowels w supplied locally, the sound given them varying with the different d lects. This is hardly conclusive, ho ever, and we must wait for furth researches on the part of schola

Hieroglyphic Egyptian	Hierarchic Egyptian	Hebrew	Phœnician	Ancient Greek	Equivalent	Ancient Latin	English (Roman)
		א		A	*a*	A	A
		ב		B	*b*	B	B
		ג		Γ	*g*	C	C
		ד		Δ	*d*	D	D
		ה		E	*h*	E	E
		ו		F	*v*	F.	F
		ז		I	*z*	Z	G
		ח		H	*ch*	H	H
		ט		⊙	*t*		I
		י		≷	*y*	I	J
		כ		K	*k*	K	K
		ל		L	*l*	L	L
		מ ם		M	*m*	M	M
		נ ן		N	*n*	N	N
		ס		+I	*s*	+	O
		ע		O	*e*		P
		פ ף		7	*p*	P	Q
		צ ץ		Z	*tz*		R
		ק		Q	*k*	Q	S
		ר		9	*r*	R	T
		ש		M	*sh*	S	U
		ת		T	*t*	T	V
							W
							X
							Y
							Z

THE EVOLUTION OF THE ALPHABET

before we can make any positive assertion on this point.

Among the peoples who used this Semitic A. were the Phœnicians. It was also used by the Jews before the exile, and the Carthaginians, but its most distinctive features were pre-

served by the Phœnicians; it is they who handed it on, through Greece and Rome, to the inhab. of the West, and hence it is the Phœnician form of the Semitic A. which we rightly regard as the ancestor of our own. But before tracing its evolution, we must say a few words about other Eastern As., also descended from the parent Semitic one.

The Aramean A. is an important branch of the Semitic. Records of this were discovered in Syria in 1890, and are dated c. 800 B.C. This A., which had assumed a distinctive character by 500 B.C., is very like the one used on the Moabite stone. It was employed by the Jews after the exile, and from it the Arabian and Syrian As. descend. Except our own the Arabian A. is the most generally used in the world to-day. It consists of twenty-eight letters, the twenty-two letters of the original Semitic A. and six new ones, placed at the end. Vowels are represented, but only in an imperfect way. Another group of As. are those employed in Persia and India. It seems fairly certain that all these are of Semitic origin, descending through the Aramean. As far as the Persian As. are concerned, this is confirmed by the evidence of the earliest extant coins, but with regard to the Indian As. we are on less sure ground. All these are descended from two As. the Kharosthi and the Brahmi. When India was conquered by Darius, the Aramean A. was introduced by the Persians, and this, modified by local conditions, became the Kharosthi. The pedigree of the Brahmi A. is more difficult to trace, but it is fairly certain that it descends from some branch of the Semitic one. There are also the Slavonic As., the Cyrillic, the Glagolitic, and others, but these can only be mentioned.

To return to the Phœnician A. At a very early stage in their history the Gks. adopted this. The earliest existing records about it in Greece go back to the seventh century B.C., but its introduction was doubtless much earlier than this. The Gks. had many local As.; practically each people had its own variant, and it was long before anything like uniformity was introduced. They made one very important change, by introducing symbols to represent the vowel sounds, and four of these, α, ε or η, ι, and ο, are common to all the Gk. As. Gradually these As. approximated more and more to each other, and c. 400 B.C. the Ionian A. was officially adopted at Athens. The Gks. dropped one or two Phœni-

German	Russian	Greek	Arabic: Final	Arabic: Medial	Arabic: Initial	Arabic: translit.	Celtic
𝔄 a	А а a	Α α a	ا	..	..	a	A a
𝔅 b	Б б b	Β β b	ب	ﺒ	ﺑ	b	B b
ℭ c	В в v, ff	Γ γ g	ت	ﺘ	ﺗ	t	C c
𝔇 d	Г г g(h)	Δ δ d	ث	ﺜ	ﺛ	th	D d
𝔈 e	Д д d	Ε ε e	ج	ﺠ	ﺟ	dj	E e
𝔉 f	Е е é, o	Ζ ζ z	ح	ﺤ	ﺣ	h	F f
𝔊 g	Ж ж z(h)	Η η e	خ	ﺨ	ﺧ	kh	G g
ℌ h	З з z	Θ θ th	د	..	..	d	H h
ℑ ij	И и i	Ι ι i	ذ	..	..	dh	I i
𝔎 k	І і i	Κ κ k	ر	..	..	r	L l
𝔏 l	К к (c)k	Λ λ l	ز	..	..	z	M m
𝔐 m	Л л l	Μ μ m	س	ﺴ	ﺳ	s	N n
𝔑 n	М м m	Ν ν n	ش	ﺸ	ﺷ	sh	O o
𝔒 o	Н н n	Ξ ξ x	ص	ﺼ	ﺻ	ss	P p
𝔓 p	О о o, a	Ο ο ŏ	ض	ﻀ	ﺿ	dh	R r
𝔔 q	П п p	Π π p	ط	ﻄ	ﻃ	t	S s
ℜ r	Р р r	Ρ ρ r	ظ	ﻈ	ﻇ	tz	T t
𝔖 s	С с s	Σ σ ς s	ع	ﻌ	ﻋ	...	U u
𝔗 t	Т т t	Τ τ t	غ	ﻐ	ﻏ	gh	**Russian (contd)**
𝔘 u	У у u	Υ υ u	ف	ﻔ	ﻓ	f	Ѣ ѣ ye, yé
𝔙 v	Ф ф ph	Φ φ ph	ق	ﻘ	ﻗ	k	Э э é
𝔚 w	Х х kh	Χ χ ch	ك	ﻜ	ﻛ	k	Ю ю yu
𝔛 x	Ц ц ts	Ψ ψ ps	ل	ﻠ	ﻟ	l	Я я ya
𝔜 y	Ч ч ch	Ω ω ō	م	ﻤ	ﻣ	m	Ѳ ѳ f
ℨ z	Ш ш sh		ن	ﻨ	ﻧ	n	Ѵ ѵ y
	Щ щ shch		ه	ﻬ	ﻫ	h	
	Ъ ъ ...		و	..	..	u	
	Ы ы yé		ي	ﻴ	ﻳ	y	
	Ь ь ...		لا	..	..	la	

SPECIMENS OF MODERN ALPHABETS

cian letters, added those for the four vowels, and their early A. consisted of twenty-three letters. Later three of these, F, M, and Q, were discarded, four new ones, φ, χ, ψ, and ω, were

added, the last being a variant of o, and at length it became the A. of classical Gk., one of twenty-four letters. As is well known, by adopting a system of rough breathing for the vowel sounds, or, as we should say, by aspirating each, or leaving it unaspirated, the Gks. added to the flexibility of their language. It should be mentioned here that c. 500 B.C. the method of writing from left to right was adopted by them in place of the reverse one.

The next important migration of the A. was from Greece to Italy. The Latins adopted twenty-one of their twenty-four Gk. letters, and at the same time varied the symbols a little. Their early A., therefore, ran thus: A B C D E F Z H I K L M N O P Q R S T V X. It will be seen that they had discarded θ, ξ, ϕ, ψ, and ω, had replaced the Q of the older Gk. A., and brought in also F. The remaining letters represent Gk. ones more or less closely. The most serious changes are that γ (gamma) has taken the form of C, and the long η (eta) has received the form H. At a later date Z was dropped; then it was brought back and placed at the end; the Gk. ψ was introduced as Y, and a new letter G was brought in to do some of the work formerly discharged by C. This was placed immediately after F, in the position previously occupied by Z. Thus the Latin A. became one of twenty-three letters.

Like the Gk., there were local varieties of the Latin A., the most important of which were perhaps the Oscan and the Umbrian, both descended from the Chalcidian Gk.

Before describing the formation of the modern Eng. A., which is the Latin A. with one or two additions, mention should be made of Ogam writing and of runes, both of which exercised some little influence upon it. These two systems of writing are allied. Both were used by early peoples in Europe, the symbols employed being those which could be carved with ease. Thus strokes were preferred to curves. Ogam writing was prevalent among Celtic peoples in Wales and Scotland, and runic inscriptions have been found all over N. Europe. The origin of the former system is unknown, but the latter is now thought to be of Gk. and not of Latin origin.

The Romans brought their A. of twenty-three letters into Britain, as they had already taken it into Gaul and other conquered countries, and it was adopted later by the A.-S. To the A.-S. A., however, three new letters were added. Two of these were runic letters, and represent as nearly as possible the sounds of *th* and *ph*. Later the influence of the Normans caused these to be discarded, and the three additional letters of our A. are quite different. They are *j*, *u*, and *w*. *j* is *i* used as a consonant; *u* is a variant of *v*, which has secured separate recognition; and *w* is *oo*, or *double u*. This letter finds no place in the Fr. A. The vowels of the Eng. A. are, like those of the Latin, five in number, but the sounds which they represent are very different.

The form of writing the letters of the A. has changed and is still changing, these changes being brought about almost imperceptibly, in order to secure greater ease and speed in writing. In our own day the flowing ſ has become obsolete, its place being taken by 𝓈 or sometimes by s, and other minor changes are being made. The Germans use a form of writing which lends itself less easily to speed than our own, but this is gradually being supplanted by the Eng. form of writing. In a utilitarian age this consideration of speed is of paramount importance, and all future changes in the A., it can safely be said, will be due to its demands

[illegible] the chief
riv [illegible] in the
S.I [illegible] through
El [illegible] to the
Io: [illegible] through
th [illegible] ts early
co [illegible] under-
gr [illegible] nsidered
th [illegible] ppeared
under the sea to reappear near Syracuse of Sicily in the fountain of Arethusa. Hence arose the myth of the river-god Alpheus pursuing the nymph Arethusa beneath the water.

Alphonsine or Alonsine Tables, an astronomica [illegible]
body of celel [illegible]
and Jewish [illegible]
of Alphonso [illegible]
They were completed in 1252, and first printed in 1483.

Alphonso, *see* ALFONSO.

Alpine Club, a society formed in 1857–8, united for the purpose of studying mountaineering, not only in the Alps, but throughout the world. It has been followed by many similar organisations throughout Europe and in the U.S.A. It commenced Alpine literature in 1859 with the publication of *Peaks, Passes, and Glaciers.* In 1863 it began to publish the *Alpine Journal.* The literature thus begun has grown to enormous dimensions.

Alpine Glow, the beautiful effect on the summits of certain Alpine peaks produced by rays of the rising and setting sun. The glow precedes the sunrise and succeeds the sunset.

Alpine Plants are those which grow

in high altitudes, as on mts. which at a greater level bear perpetual snow. They are xerophytic plants, their conditions giving them a low degree of transpiration, and they exhibit most of the characteristics of Arctic plants. The flowers are more brightly coloured than those growing in lower regions, the roots are large, and the leaves frequently hairy, and often exist for long periods covered with snow; in themselves the plants are small and tufted. Most of the flowers are self-pollinated, owing to the scarcity of insects, though moths and butterflies are found at some high levels, *e.g.* the Alps, and vegetative reproduction is common. A. P. are generally shrubs and herbaceous plants. The most numerous of these are the various saxifrages, the edelweiss, rhododendron, campions, lady's mantle, violas, and primulas. There is naturally considerable variety among the flowers, as they live on damp or on rocky soil, and on damp soil such lower plants as mosses and liverworts abound. *See* A. F. W. Schimper's *Plant Geography*, trans. 1903.

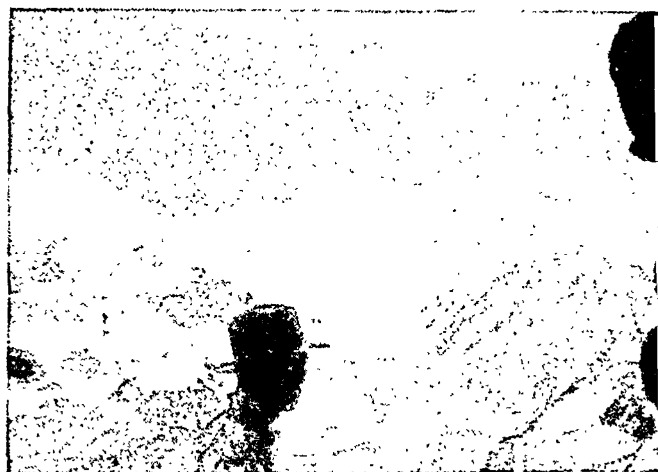
Alpini or Alpinus, Prosper (1553–1617), a Venetian botanist, *b.* at Marostica. He studied at Padua, and became professor of botany there. He did much valuable botanical research in Egypt. His chief works are: *De Plantis Ægypti*, *De Medicina Ægyptiorum*, *De Medicina Methodica*, and *Exotic Plants*.

Alpinia is a sub-tropical genus of Zingiberaceæ found in Asia and Australia. *A. galanga* yields a kind of arrowroot and galangale, which is largely used in the East in the place of ginger.

Alpnach, or Alpnacht, a vil. of Switzerland, canton of Unterwalden on Lake A. (an arm of Lake Lucerne). It is notable for the now disused *Slide*, a wooden construction by which timber was sent down from Mt. Pilatus. Pop. 1700.

Alps (possibly derived from a Celtic word meaning 'high,' or connected with Lat. *albus*, white), a massive mt. range covering an area of over 80,000 sq. m., extending from the Mediterranean to the Danube, a distance of some 600 m. The width of the ranges varies from 80 to 150 m. It is the most extensive mt. system of Europe, forming, in fact, its backbone. Its length is cut up by valleys in all directions, and many of its component ranges run parallel, as in the Central A., or obliquely, as in the Western. From very ancient times the div. of the A. has been threefold: the Western A., extending northward from the Mediterranean to Mont Blanc; the Central A., from Mont Blanc to the Brenner Pass; the Eastern A., from the Brenner Pass to the Hungarian Plains.

I. The Western A. comprise the following principal ranges: (1) The Maritime A., generally of no great height, but extremely broken and irregular. (2) The Cottian A., containing sev. peaks over 12,000 ft. high. The small group of Oisans to the W. of this contains the Pic des Ecrins (13,462 ft.). (3) The Graian A., generally higher than the Cottian, which attain in Mont Paradis a height of 13,300 ft. II. The Central A. are generally subdivided into a N. and a S. chain, running fairly parallel. They comprise many groups, of which



MONTE ROSA AND LYSKAMM IN CLOUDS

the chief are the Bernese A. in the N. chain, and in the S. the Pennine, Lepontine, and Rhætian A. It is here, in the neighbourhood of Mont Blanc, that the A. reach their greatest elevation and that the best-known peaks occur. In the Bernese A. we have Finsteraarhorn (14,026 ft.), Jungfrau (13,671 ft.), Mönch (13,465 ft.), Eiger (13,040 ft.), Schreckorn (13,385 ft.), and Wetterhorn (12,150 ft.). The Pennine A. contain Mont Blanc (15,732 ft.), Monte Rosa (15,151 ft.), Weisshorn (14,803 ft.), Breithorn (13,685 ft.), and Matterhorn (Mont Cervin) (14,780 ft.). The Rhætian A. are at a lower level, though containing many peaks over 11,000 ft. high. The Ortler A. to the E. of these are slightly higher, Ortlerspitze itself being 12,800 ft. III. Of the Eastern A. the principal chains are: (1) the Noric A., with the height of Gross-Glockner; (2) the Carnic A.; and (3) the Julian A.

The extreme inequality of the A. renders them easy to cross. Even in the highest part, the W. end of the Central division, passes are numerous, and five railway tunnels now render travel easy. These tunnels are the Mont Cenis, connecting France and Italy; the Simplon, connecting the valley of the Upper Rhone with Lake Maggiore; the St. Gothard, connecting Lake Lucerne and Lake Maggiore; the Brenner tunnel, connecting Munich and Innsbrück with Verona and Venice; and the Arlberg tunnel, connecting Switzerland and Austria. There are passes over most of these mts., among the more notable being the two St. Bernard passes and the Splugen.

The constitution of the A. is the esult of much faulting and folding, uainly N.E. and S.W. Many upeavals have occurred at different eriods, and remarkable examples of hrusts are common. The higher dges consist chiefly of crystalline hists associated with granite. The mmits rise considerably above the ne of perpetual snow, and the forms vegetable life vary with the altide from that common to Central rope to that of the Arctic regions. e larger animals are becoming rare ng to the ravages of sportsmen, the smaller fauna are numerous. laciers occur chiefly in the Central They give rise to numerous rivs., vhich the chief are the Rhine, ne, Po, and Danube. Their nums gradually decreasing, and must have been very considerable. ne scenery of the A. is renowned ghout Europe and draws annunany tourists, who are gradually ning the peasantry. The beauty lakes (such as Lucerne, Geneva, Brienz, Thun, Zurich, Constanc Maggiore, Como, Garda) and the mt views, together with the excitemen and pleasure of mt.-climbing, combin as attractions. Invalids may here seek repose and health in the sanatoria, such as Davos, and St. Moritz, tourists may contemplate the natural marvels or give themselves up to the Alpine sports. The A. indeed deserve their name of the playground of Europe.

About no other geographical subject has so much been written as about the A. The various Alpine clubs all publish periodical papers, and these publications give good information. *See also* Tyndall's *The Glaciers of the Alps*, London, 1896, and *Hours of Exercise in the Alps*, 1873; Bonney's *The Alpine Regions of Switzerland and the Neighbouring Countries*, London, 1868; Ball's *Alpine Guide*, 3 vols.; Schlagintweit's *Untersuchungen über die physikalische Geographie und Geologie der Alpen*, Leipzig, 1850–54; Umlauft's *The Alps*, Eng. trans., London, 1889.

Alpujarras, a mountainous dist. of Spain, lying to the S. of the Sierra Nevada. The valleys are extremely fertile and beautiful, and are inhabited by descendants of the Moors. 'Alpujarras' is the Moorish 'grassland.' The four largest vils. are Lanjaron, Orgiba, Trevelez, and Ugijar.

Alruna, a word etymologically connected with runes and used to denote a witch in anct. times. Sometimes the word was applied to images used in the black art.

Alsace-Lorraine, formerly a prov. of France; between 1871 and the Great War an imperial ter. of Germany. It is bounded on the N. by the Bavarian and Rhenish Palatinates, on the E. by the Rhine, on the S. by Switzerland, and on the W. by the Vosges; has an area of 5580 sq. m. and a pop. of about 1,875,000. It is divided into Upper and Lower Alsace, and Lorraine. The dist., which is fertile and attractive, is generally undulating, and lies within the Rhine basin, being watered by the Ill, Moder, Saar, and Moselle, tribs. of the Rhine. A large proportion of the land is arable, and corn, flax, tobacco, wine, and fruit are largely produced. There is abundance of timber, and considerable mineral wealth, copper, lead, iron, coal, and rock-salt are mined, and silver has been found. The chief manufs. are textiles, chemicals, glass, and paper. The chief cities are Strasburg, Mühlhausen, Metz, and Colmar. From the earliest times it has been a disputed ter. Originally inhabited by the Gauls, after the Rom. conquest it became largely Germanised. It became part

of the Frankish empire, and after the tenth century of the Ger. empire, till part of it was ceded to France in 1648 at the peace of Westphalia. The remaining portion was seized by Louis XIV. in 1681, and secured by the peace of Ryswick in 1697. A few outlying dists. were secured by France after the 1789 revolution. Early in the Franco-Ger. War of 1870–1 the dist. fell into the hands of the Prussians, and was immediately reorganised. It was formally ceded by the treaty of Frankfort, much against the wishes of the inhab. In 1872, when obliged to make choice of nationality, 160,000 elected to be Fr., of whom 50,000 returned to France. In 1911 a local parliament or diet was established for A.-L. See *About Alsace-Lorraine*, 1871–72.

Since the Franco-German War of 1871 the deliverance of A.-L. from the Ger. yoke became an article of faith in the political creed of France. When the Great War broke out, the hope of regaining the lost provinces was reawakened in all its intensity, and even during the darkest days of 1917 when the issue of the war seemed in doubt, the passionate determination to settle the future of the provinces never wavered. When Moltke in 1871 insisted upon, and Bismarck, against his better judgment, acquiesced in, the annexation, the dominant idea in their minds was to secure a *strategic* frontier. At the same time, Germany, probably unwittingly, also secured the largest deposit of iron ore in Europe and thereby in the ensuing forty years built up her imposing fabric of prosperity and power. From the natural wealth of the ravished provs. Germany, in fact, derived that metallurgical ascendancy and the motive power for her industries upon which was founded no small part of her material progress, and, in consequence, her formidable naval and military strength. In actual figures, of the 2,800,000,000, tons of iron ore in all Germany before the War, Lorraine alone yielded some 2,000,000,000. Up to 1903 Germany had no need to import from abroad a single ton of ore, the supplies from Lorraine enabling her to maintain for over three decades an unrivalled industrial expansion. Without these resources Germany would, long before 1918, have exhausted her capacity for turning out the essential material of war. The Fr. people were by no means oblivious of these commercial advantages, but their ardent desire to recover the provs. was not primarily founded on the possibility of crippling the industrial power of Germany by depriving her traditional adversary of over 40,000,000 tons of ore a year. This transference of material resources was but the means to the accomplishment of the one permanent object—namely, to secure a boundary which, for the sake of future generations, should put an end once for all to the perpetual menace of a Ger. invasion. Hence, throughout the vicissitudes of the Great War, the Allied diplomacy was unequivocal in its *assertion* that when the time came for pourparlers, no lasting peace would be possible unless and until the restoration of A.-L. to France was made an indispensable condition.

Both on humanitarian and sentimental grounds the claims of France were indisputable, and it was from these grounds that the ardour of Fr. hopes during the forty years after 1871 derived its impulse. But these same inspiring motives were to a certain extent subordinated, during the War, which, by its very magnitude, threw into bold relief the greater issue of Germany's bid for world dominance. The relatively local question had in fact become a major issue for the whole of Europe, and it was axiomatic in the common policy of the Allies that the restoration of European equ librium was not to be attained without the transfer of the 'lost provinces' to France.

If, however, the reinstatement was imperative as the solution of a question of modern practical politics, much justification for Fr. claims could be advanced on historical grounds. The Ger. plea that A.-L. ought always to have been Ger. territory because the provs. formerly belonged to the Holy Roman and Germanic Empire, was untenable, the subsequent long connection between the two provs. and France having so far eliminated all Ger. influences as to reduce the plea to a mere mediæval archaism. From the standpoint of practical politics, however, it is useless to go further back than 1815, when the provs. on the l. b. of the Rhine were taken from France by the rest of Europe and given to Prussia with the object of checking Fr. aggrandisement. Cynicism prompts the retort that the Great War merely showed that the boot was on the other foot; but inasmuch as this transference had failed, by reason of the unsuspected and unscrupulous aggressiveness of Prussia, as a political measure of precaution to preserve the balance of power in Europe, it was recognised even before 1871 as an initial error. Yet the error was repeated in 1871, when the Powers stood by while Germany, grown immeasurably in political

stature since Waterloo, annexed, without the smallest pretext of adjusting the equilibrium of Europe, yet another considerable portion of her neighbour's territory, a portion embracing the most valuable Fr. iron-mines and most of her blast furnaces.

In the strategic concentration immediately before hostilities opened in the Great War, the Ger. VIth army of five corps under Prince Rupprecht of Bavaria was concentrated in Lorraine, E. of Metz. A detachment of *ersatz* (reserves) and *landwehr* troops was posted in the S. portion of Alsace. From this it was clear that an offensive in Alsace and Lorraine was intended as soon as possible. To disturb the Ger. concentration, the Fr. 7th Corps, stationed at Belfort, was ordered to advance towards Mühlhausen. One brigade reached Mühlhausen on Aug. 10th, 1914, but was driven back in disorder. After this the Fr. formed an army of Alsace and projected a second invasion. The army, moving on Aug. 15th, occupied the Vosges passes and reached Mühlhausen on the 19th. An army of Lorraine was also formed to watch Metz, and protect the flanks of the Fr. 2nd and 3rd Armies by driving the Germans behind the outer works of Metz. These objectives formed part of the Fr. plan for a general offensive on the whole W. Front, but the plan lacked the axiomatic merit of simplicity. When the Fr. had reached Saarburg the Germans counterattacked, drove the Fr. from the northerly passes and out of all but a small part of S. Alsace. In the course of 1915 a stalemate along the whole front resulted, which in Alsace involved give-and-take fighting on the high ground round Münster and in very severe fighting for the massif known as Hartmanswillerkopf. No definite issue was reached and, as on the rest of the front, trench warfare succeeded the war of movement.

The Treaty settlement.—Under Article 51 of the Treaty of Versailles A.-L. was restored to Fr. sovereignty as from the armistice of Nov. 11, 1918, and the provisions of the Treaty establishing the delimitation of the frontiers before 1871 was restored. Free zones were established in the ports of Strasburg and Kehl, in conformity with the navigation and railways clauses of the treaty, and due provision was made for reinstatement of inhabitants in Fr. nationality.

Alsatia, the original name of Alsace, applied in the seventeenth century to the dist. of Whitefriars, between the Thames and Fleet Street, which was used as a refuge by debtors and criminals.

Al-segno, a musical term of It. derivation, and meaning 'to the sign.' It directs the musician to revert to the sign :S: and continue from there to the first double bar.

Alsen, is. in Little Belt, Baltic, off coast of Schleswig, about 19 m. long and 3–12 m. broad, with an area of about 120 sq. m., and a pop. of 25,000. Sonderburg, is the chief tn., exports grain and fruit. Originally Dan. but ceded to Germany in 1864.

Al Sirat (the Path), in the theology of [illegible] is the name of a [illegible] er the abyss of he [illegible] ;assed by every one in order to enter paradise. It is described as being narrow like the edge of a sword.

Alster, riv. in Holstein, Prussia, formed by confluence of three streams. Forms Great A. Lake near Hamburg, through which it flows into R. Elbe.

Alston, *see* CUMBERLAND.

Alstrœmeria, a genus of S. American plants of natural order Amaryl-*lidaceæ*, named by Linnæus after the Swedish botanist Alstrœmer (1736–94).

Alt, or **Aluta**, trib. of Danube, rising in Transylvanian Carpathians and flowing through E. Carpathians and Roumania.

Alta (It., high), in music, generally used in addition to the word *ottava*, as *ottava alta*, an octave higher, *piu*, more, being by custom omitted.

Altai Mts., mountainous region of Tomsk (Siberia) and Mongolia, with an area of 53,000 sq. m. The highest ridge is the Saïlughem, the mean elevation of which is about 5000 ft. The passes are few and dangerous. The valleys are very fertile, and there is great mineral wealth. The chief tn. is Barnaul.

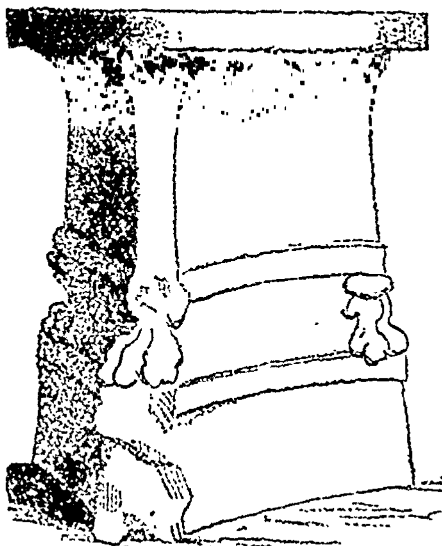
Altair, an Arab word used to denote a star brighter than the first magnitude (0·9) in the constellation of the Eagle (Aquila). The luminosity of A. is about six times greater than that of the sun, and it has a proper motion of 65″ a century.

Altamaha, a riv. of Georgia formed by the junction of the Oconee and Ocmulgee and flowing into the A. Sound. It is 155 m. long, and is navigable for its entire length for boats drawing 5 ft. of water.

Altamura, tn. of Apulia, Italy, 28m. S.W. of Bari; it is of great antiquity, and has a fine Romanesque cathedral. Pop. 25,560.

Altar, a piece of religious furniture used for supplication and sacrifice. The use of the A. seems to have been almost universal in all times and among all nations. They have been

found in Babylonian and Assyrian remains, and among Egyptian ruins. Early sacrificial hearths have been excavated in Palestine, and appear to be of the primitive description suggested in the early parts of the O.T. Later there were two kinds of As. in use among the Jews, for burnt-offering and incense respectively. In anct. Greece and Rome As. were again of two types: low pedestals which stood inside the temple before the sacred image, and large erections in the open air, used for burnt sacrifice. In almost all circumstances As. have been considered as places of refuge, and frequently as fit places for the solemnisation of oaths. The earliest



ASSYRIAN ALTAR

Christians had no As., but they came into use with the cessation of persecution, and were erected over the relics of martyrs. They were oblong in shape and placed in the axis of the church. In mediæval times the numbers increased, the chief in each church being known as the 'high A.' After the Reformation, the Eng. Church replaced As. by movable communion tables.

Altazimuth, an important astronomical instrument for ascertaining the altitude (*q.v.*) and azimuth (*q.v.*) of celestial objects, hence the name. It consists of a telescope revolving on a horizontal axis, to the side of which is rigidly attached a vertical graduated circle (read by optical aid) for ascertaining alt. This apparatus is capable of moving above a horizontal circle, also read by microscopes, by which the azimuth of a heavenly body is determined. It is sometimes called a 'universal transit,' but as a rule in large instruments its horizontal motion is small, being confined to a few degrees each side of the meridian. The A. invented by the Dan. astronomer, Olaus Römer, 1690, was capable of measuring all parts of the sky. All important observatories have this instrument, and Airy's A., erected at Greenwich in 1847, considered a fine instrument in its day, was replaced by a larger one in 1897.

Altbodmann, a vil. in the grand-duchy of Baden. It was the favourite residence of the successors of Charlemagne.

Altdorf, cap. of canton Uri, Switzerland, lies in a fruit-growing valley, surrounded by imposing mts. It is the traditional scene of the exploits of William Tell, the liberator of Switzerland from the Austrian yoke. A monument to him stands in front of an old fifth-century tower. In the Tell Theatre (1925) Schiller's *Wilhelm Tell* is performed by Altdorf residents in summer. Pop. 4130.

Altdorfer, Albrecht (1480–1538), Bavarian painter, engraver, and architect, *b.* and *d.* at Ratisbon, of which he was city architect and a burgher. His most famous picture is the 'Battle of Arbela,' at Munich. His engravings on wood and copper rank next to those of Dürer.

Altea, seaport of Spain, 25 m. N.E. of Alicante, on the Mediterranean. It has a good harbour and some trade. Pop. 6000.

Altels, a well-known summit of the Alps, 11,930 ft. in height, and situated E. of the *Gemmi Pass*. Avalanches make the ascent very dangerous. In 1834 a Swiss reached the top.

Alten, Carl August (1764–1840), Hanoverian and British general. Served in Hanoverian army till its disbandment in 1803, when he came to England and entered the Ger. Legion, serving in Hanover and Copenhagen. He commanded in the Peninsular War, and at Quatre Bras and Waterloo. When the Ger. Legion was disbanded he went to France, and later returned to Hanover, where he became minister of war.

Altena, tn. in Westphalia, Prussia, on R. Lenne, 18 m. S.W. of Arnsberg. It contains an anct. castle, and has manufs. of iron, copper, brass, and nickel goods.

Altenavia, the Lat. form of Altona (*q.v.*), a tn. in the prov. of Schleswig-Holstein, near Hamburg.

Altenberg, Peter (1859–1919), Austrian author and lyric poet, of Jewish extraction, whose real name was

Richard Engländer. He was *b.* and *d.* in Vienna, and studied law and medicine there. He was then a bookseller in Stuttgart, and suffered from a nervous illness which compelled him to give up trade. He settled in Vienna, and in 1896 issued his first book—a collection of poetical-prose sketches entitled *Wie ich es sehe*, which remains his best work. Afterwards appeared *Was der Tag mir zuträgt*, 1900; *Märchen des Lebens*, 1908; *Vita Ipsa*, 1918; and *Mein Lebensabend*, 1919. His prose sketches pleased the transient Bohemianism of the time. As a poet, he consistently cultivated pure impressionism. German critics attribute much of his popularity to an ironic originality which appealed to a passing taste.

Altenburg, a tn. in Thuringia, Germany, formerly cap. city of duchy of Saxe-Altenburg, Germany, on R. Pleisse, 25 m. S. of Leipzig. It contains a famous ducal castle, built on a perpendicular porphyry rock, the scene of the abduction of Princes Albert and Ernest in 1455, and numerous fine municipal buildings. There are manufs. of brushes, gloves, hats, cigars, and woollen goods. Pop. 41,300.

Altendorf, formerly a separate commune of manufacturing vils., since 1901 a suburban dist. of Essen, Rhenish Prussia.

Altenessen, a suburban dist. of Essen, Rhenish Prussia, lying 2 m. N. of that city, possessing coal mines and machine factories. Pop. 33,450.

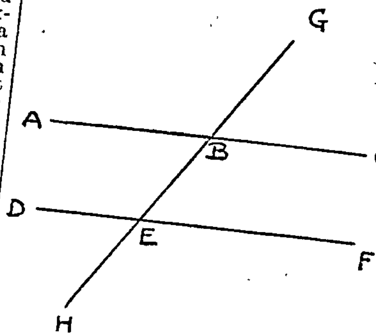
Altengaard, seaport tn. in the prov. of Finmark, Norway, at the head of the Alten Fiord.

Altenstein, Karl, Baron von (1770–1840), Prussian statesman, *b.* at Ansbach, and studied at Erlangen and Göttingen. He was head of the inance dept., and later minister of ublic worship and education, renering great service to the univerities.

Alterative, a medicine that alters e processes of nutrition for the etter, restoring, in some obscure ay, the normal functions of the gans. The most important As. are senic, iodine and the iodides, and ercury.

Alter Ego (Lat.), signifies 'another The phrase is used to denote viceroys when exercising regal er, and was used at Naples when crown prince was made vicareral during the rebellion of 1820. words are used of a close d.

ternate. In geometry angles are to be A. which are made by two with a third, on opposite sides



Thus

ABE and BEF CBE and DEB ABG and HEF GBC and DEH	are alternate angles.

In algebra those terms of a proportion are said to be A. which are separated from one another by another term; thus in the proportion 2 is to 4 as 8 is to 16, 2 and 8 are A. terms, as also 4 and 16.

Alternate Quartering, *see* HERALDRY.

Alternation of Generations is a biological phrase which indicates a curious condition in the life-history of some animals and plants, which have both a sexual and an asexual stage of reproduction. It is not found in the lowest plants, but is seen in some of the intermediate ones very clearly, and in animals is best observed in low forms of existence. It is believed that this condition can be traced in the highest of animals as it can be in the highest of plants. In the vegetable kingdom the asexual plant which produces spores is called the *sporophyte*, the sexual plant which produces gametes (sexual cells) the *gametophyte* or *oöphyte*. In the ferns and horsetails the generation with which we are familiar is the sporophyte—in the fern the small brown bodies beneath the fronds are the asexual spores—and the sexual generation is not prominent; the gametophyte is a small green body growing on damp soil which gives rise to both male and female organs which produce again a fern as we know it. In the life-cycle of the mosses and liverworts the gametophyte generation is more conspicuous: the sporophyte is often seen rooted in the gametophyte as a brown stalk with a spore case at its apex. Among animals the Cœlenterata exhibit alternation of generations very clearly; here the

ovum, which has been fertilised, produces a polyp capable of giving rise to buds, which in their turn give rise to jelly-fish which contain sexual elements. See D. H. Scott's *Structural Botany*, part ii., 1907, for comparisons of gametophyte and sporophyte generations; see also J. J. Steenstrup's *Om Forplantning og Udvikling gjennem vexlende Generations Rækker*, 1842.

Alternator, the machine used in electricity to produce an alternating current. It is a species of dynamo.

Althæa, a genus of plants of the order Malvaceæ which are common in Europe. *A. rosea*, the hollyhock, found wild in China, grows in British gardens; *A. officinalis*, the marsh-mallow, grows in marshes.

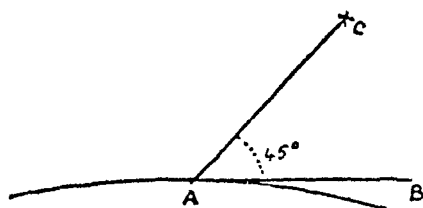
Althein, or **Asparagon**, a crystallisable white substance found in the root of marsh-mallow and asparagus.

Althing, the parliament of Iceland, organised at Thingvellir in A.D. 928 to supersede the Norse Thing. It has thirty-six members, of whom thirty are elected by vote of the people, but the remaining six are appointed by the king.

Althorn, or tenor saxhorn, is a valve-bugle in E flat, often used instead of a Fr. horn in military and brass bands.

Althorp, see SPENCER.

Altitude, an astronomical term signifying the angle of elevation of a celestial body above the horizon. Thus if A be the position of an observer on the earth, A B the line of the horizon directly beneath the heavenly body, and C represents the planet or star, then the angle C A B is the A. of the star. As the circumference of a circle is divided into 360°, it follows that a star exactly overhead is of an A. of 90°, while one, as in diagram, halfway between zenith and horizon, is of an A. of 45°.



The A. of a star, as ascertained by a sextant, is used for calculating a ship's position at sea. See ALTAZIMUTH and AZIMUTH.

Altmühl, a riv. in Bavaria and affluent of the Danube. It is 103 m. long. Charlemagne conceived the idea of connecting the riv. with the Regnitz and hence with the Rhine and Danube. This plan has been executed by the Bavarian government.

Alto (It., high), or counter-tenor in men, is the highest pitch in the male voice; contralto in women and boys is the lowest pitch of the voice. It originated in church music of the sixteenth century, and as it was too difficult for boys to learn to sing A., and women, according to the rule *mulier taceat in ecclesia*, were not allowed to sing in church choirs, it was assigned to men of high-pitched voices.

Alto Clef, the clef with C on the middle line, is now used only for viola music, but formerly was employed for the alto voice.

Alto di Viola is an It. term for the tenor violin, so called because it used to take the highest parts, while the *basso di viola* took the lowest in instrumental music.

Alton: 1. A tn. in Hampshire, England, on R. Wey. Contains many breweries and sev. paper mills and iron foundries. Pop. 5581. 2. City in Madison co., Illinois, U.S.A., on R. Mississippi, 25 m. N. of St. Louis. The seat of a Catholic bishopric. It has numerous manufs., an oil refinery, a lead smelter, and limestone quarries. Pop. 30,142.

Alton, Eduard Josef d' (1772–1840), a distinguished anatomist and naturalist, was b. at Aquileia, near Trieste. His chief work is *Die Naturgeschichte des Pferdes*. His son, Johann Eduard d'Alton (1803–54), was a professor of anatomy at Halle, and wrote *Handbuch der Vergleichenden Anatomie des Menschen*.

Altona, city in Schleswig-Holstein, Prussia, on R. Elbe, adjoining Hamburg, of which, commercially, it forms a part. It has fine municipal buildings, and numerous manufs., of which tobacco is among the chief. The maritime trade is largely dependent upon Hamburg. In 1640 A. became Dan.; in 1713 it was burnt by the Swedes; and in 1866 passed to Prussia. Pop. 172,400.

Altoona, city in Blair co., Pennsylvania, U.S.A., 117 m. E. of Pittsburg. It has large locomotive works, machine shops, and freight yards connected with the Pennsylvanian railway. Pop. 81,503.

Altorf, see ALTDORF.

Alto-relievo (It., high relief), a term applied to that mode of sculpture in which objects are made to project from their background to the extent of more than one-half their thickness, so that some portions of the figures stand free. See BASSO-RILIEVO.

Altötting, tn. in Bavaria, Germany, on R. Morren. It is an anct. Rom. Catholic place of pilgrimage, on

account of a famous image of the Virgin. Pop. 5280.

Altranstadt, a vil. of Prussia near Lützen. Charles XII. of Sweden concluded the treaty here with Augustus II. of Poland, whereby the latter resigned the kingdom of Poland.

Altrincham, or **Altringham**, a tn. in Cheshire, England, on Bridgewater Canal, 8 m. S.W. of Manchester, for which it raises fruit and vegetables. It has sawmills and an iron foundry, and manufs. yarns. Pop. 20,450.

Altruism (Fr. *l'altruisme*, from It. *altrui*, of or to others), a word coined by the Fr. positive philosopher, Auguste Comte, and introduced by his followers into this country, where it has passed into general use. It is the antonym of *egoism*, and if the latter be defined briefly as 'each for himself,' A. stands for 'living for others.' The altruistic instinct is a social instinct or impulse in human nature, and is evidenced in kindness, veneration, and affection. It is not the exclusive possession of humanity, but manifested by many of the higher types of animals. It was this instinct or tendency in man that Comte wished to raise to a conscious principle, or an ethical ideal, which made the chief aim of human action that of seeking the welfare of others. Herbert Spencer in his *Data of Ethics* sought to show that in the course of social evolution egoism and A. would be conciliated.

Altschul, Elias (1812–65), a Ger. professor of medicine, *b.* at Prague, and the author of many well-known medical treatises.

Altstätten: 1. A tn. of Saint Gall, Switzerland. The Austrians took it in 1410. It has famous sulphur springs. 2. A tn. in Zurich.

Altwasser (lit. 'old water,' a name which refers to the mineral springs), a vil. in the Prussian prov. of Silesia. There are extensive iron foundries in the vicinity. Glass and porcelain are also manufactured here.

Alt-Zabrze, a vil. of Prussia in the prov. of Silesia. There are important manufs. of machinery here. Coal is mined in the vicinity.

Aludel, a pear-shaped pot in glass like an alembic used in chemistry.

Alum, the crystallised double sulphate of aluminium and potassium, corresponding to the formula $Al_2(SO_4)_3 + K_2SO_4 + 24H_2O$. The name is also used to designate a group of bodies of the same general structure, where the first sulphate is that of aluminium, chromium, or ferric iron, and the second that of potassium, sodium, the ammonium radical, rubidium, cæsium, thallium, or silver. The A. of the ancients (Lat. *alumen*) included a group of astringent substances of which potash A. a
naturally-occurring aluminium
phate appear to have been the
In the middle ages the manuf
mainly in the hands of Italians,
factory at Tolfa in the papal s
continued producing up to a r
period. The raw material of
manuf. is A. rock, composed chief
alunite or A. stone. This is m
with fuel in a furnace and a
roasting exposed to the air.
mass is then lixiviated with
water, the clear liquid drawn off a
allowed to crystallise. A. is a
made from A. shale, which is eit
allowed to decompose by exposure,
roasted. During the process, f
sulphuric acid is formed, which ac
upon the clay, producing aluminiu
sulphate, which is then dissolved ou
Potassium sulphate or ammoniu
sulphate is added to the solutio
when potash A. or ammonia A. i
produced.

A. possesses a sweet astringen
taste, and is used as a mordant i
dyeing and in the manuf. of paper
Most As. have an acid reaction, but, i
an alkali is slowly added to the solution, a precipitate is formed which is re-dissolved on stirring. If this be done until no more precipitate can be dissolved, the product is a neutral A., which is much used in dyeing, as it readily gives up alumina to the colouring matter.

Alum Bagh, a fort in India about 4 m. from Lucknow which, during the Indian Mutiny in 1847, was used as a fortress by the rebels. It was taken by Havelock and Outram, and was later defended for a long period by the latter.

Alum Root, or *Heuchera Americana*, belongs to the order Saxifragaceæ and grows in N. America; it makes a valuable styptic. The term is also applied to the *Geranium maculatum*, of the order Geraniaceæ. A.R. is used for ulcers.

Alum Shale, a rock found in the Silurian and Devonian systems, and composed of iron pyrites, distributed through bituminous shale. It is used for the manuf. of aluminium sulphate.

Alum Stone, or **Alunite**, a double compound of potassium sulphate and basic aluminium sulphate. Mixed with quartz, it composes the alum rock from which alum (*q.v.*) is obtained.

Aluminium (written and pronounced in Canada and U.S.A. 'aluminum'), a metallic chemical element. The oxide alumina (Al_2O_3) occurs in combination with silica in clays and felspar of all kinds, and is, therefore, widely distributed. The oxide is found uncombined in bauxite, corundum, emery, ruby, amethyst,

sapphire, and topaz, the different colours being due to the presence of oxides of iron, cobalt, or chromium. Alumina was long supposed to be an oxide before separation into its elements was actually accomplished. A. was first produced in 1827 by Wöhler, who fused potassium and chloride of A. in a closed crucible, obtaining the metal in the form of a grey powder. Afterwards, Wöhler improved his method and succeeded in procuring the metal in a purer form in fused globules. In 1854 Deville tried the same process, but replaced the potassium by sodium, and the 'silver made from clay' of the Paris exhibition of 1855 drew much attention to the question of its economical production. The method used at the present day is the electrolysis of alumina. An iron pot, lined with carbon, is charged with cryolite and heated to about 800° by the electric current. For the electrolysis, a bundle of carbon rods is used as the anode, whilst the pot itself forms the cathode. The oxygen liberated combines with the carbon of the anode to form carbon dioxide, whilst the A. falls to the bottom of the vessel. More alumina is added and the process continued, the molten metal being drawn off from time to time.

A. is a tin-white metal, malleable and non-magnetic, has a specific heat of ·222°, a sp. gr. of from 2·57 to 2·67, a coefficient of expansion of ·0000222, and melts at 626° C. It is about as hard as silver under ordinary circumstances, but becomes harder on rolling. If pure, it does not oxidise easily on exposure to the air at ordinary temps., is soluble in hydrochloric acid, and forms numerous useful alloys. The properties which make A. such a valuable metal are its lightness, ease of working, non-poisonous qualities, and the fact that it is not affected by air. It is used for making cooking utensils, electric conductors, motor-car parts, and, in fact, for any purpose where saving in weight is a great consideration. Alloyed with a small percentage of magnesium, its hardness and toughness are considerably increased without making any material difference in its weight.

Alumography, or **Algraphy,** a method of printing in which aluminium plates take the place of the stone blocks in lithography.

Alundel Furnace, a system of cylindrical furnaces used for the reduction of mercurial ores. Retorts of glass, called As., collect the condensed vapour.

Alunno, Niccolo (*c.* 1430–1502), an Umbrian painter of the fifteenth century who lived at Foligno. He excelled in expression, and some of his works are: The altarpiece at Deruta, 1458; 'The Madonna' in the Duomo, Assisi, besides many other works at Assisi; an altarpiece at the church of San Niccolo, Foligno; and 'The Saviour' and 'A Virgin of Mercy' in the Louvre. A 'Bust of Christ' in the National Gallery, and S. Francis, S. Catherine (?), called 'Giotto,' in the University Gallery, Oxford, are ascribed to A.

Alunogen, the word used by Beudant to designate hydrous sulphate of aluminium, and popularly called alum rock. The chemical formula is $K(AlO)_3(SO_4)_2 + 3H_2O$, and the sp. gr. is 32·6. It is white with green shades through it. The substance is found in volcanic dists., and in mines and caves. From it is extracted alum proper.

Alured, Alred or Alfred, of Beverley, was an old Eng. chronicler and historian of the early part of the twelfth century, and treasurer of the church of Beverley. He wrote a history of Britain up to 1129.

Aluta, or **Alt,** a trib. of the Danube which rises in the Carpathian Mts., flows through Transylvania and Roumania, and enters the Danube near Nicopoli. The total length is c. 250 m.

Alva, tn. in Clackmannanshire, Scotland, at foot of Ochils, 7 m. N.E. of Stirling. It has large woollen manufs. E. of the tn. is the picturesque Silver Glen, in which are abandoned silver-workings. Alva House is the seat of the Johnstones. Pop. burgh 4107; parish, 5120.

Alva, or **Alba, Fernando Alvarez de Toledo** (1508–83), descendant of one of the noblest families of Spain, was a soldier from his youth. After fighting in Tunis, Germany, and Italy, he was in 1567 given, by Philip II., command in the Netherlands. Here he carried on a reign of terror till his recall in 1573.

Alvarado, Juan Bautista, a Californian who raised an insurrection against the Mexican gov. in California and defeated the Mexicans in the decisive battle of San Buenaventura. From 1836 to 1838 he took the revolutionary title of governor, and from 1838 to 1842 was officially recognised by the Mexican government.

Alvarado, Pedro de (*c.* 1495–1541), Sp. explorer and adventurer, *b.* at Badajoz. His first command was in the Cuban expedition to Yucatan in 1518, and he served under Cortes in the conquest of Mexico, becoming famous in 1620 by the 'Salto de A.,' a long leap by which he saved his life. In 1523 he was sent to subdue Guatemala, and was later appointed governor of that dist. by Charles V. In 1534 he made an unsuccessful expedition against Quito. He became

governor of Honduras in 1537. In 1541 he was killed in an affray with the Indians near Guadalajera, Mexico.

Alvarado, seaport of Mexico, on riv. of same name, 40 m. S.E. of Vera Cruz. The port is good but too shallow to admit vessels of more than 13 ft. draught. Pop. 4000.

Alvares, Fernam (1540–99), Portuguese poet, *b.* in India. He was leader of two expeditions to the Coromandel coast. The most remarkable of his works is his *Lusitania Transformada.*

Alvarez, Don José (1768–1827), an eminent Sp. sculptor, *b.* at Priego, Cordova. He first worked with his father, a stonemason, and obtained admission into the Academy of Granada, 1788. He afterwards became a member of the Academy of Cordova, and a student of the Academy of San Fernando, Madrid. In 1799 he received a pension from Charles IV. to study at Paris and Rome, and his statue of Ganymede, fashioned in 1804, gained for him the reputation of the greatest of modern sculptors. He was appointed principal sculptor to the King of Spain, 1825. He executed statues for Napoleon and for Ferdinand VII., and died in Madrid. A scene in the ' Defence of Saragossa ' and a group of ' Antilochus and Memnon ' are two of his chief works.

Alvarez de Cienfuegos Nicasio (1764-1809), a Sp. writer, *b.* at Madrid. Of his tragedies the most famous are *Pitaco* and *Loraida.* He was a member of the Sp. Academy.

Alvarez, Francisco (*d.* 1540), a Portuguese traveller, was *b.* at Coimbra in the latter part of the fifteenth century. He was one of those sent by King Emanuel of Portugal on an expedition to Abyssinia in 1515, and on his return to Lisbon, 1527, he wrote an account of his travels. This work, a copy of which is in the British Museum, is remarkable for its simplicity and frankness.

Alvensleben, Konstantin von (1809–92), a distinguished Prussian general, served in the Danish War. He commanded in the Franco-Prussian War and won high distinction at Orleans and Le Mans. A fort at Metz is named after him.

Alveary : 1. A bee-hive. 2. The outer canal of the ear, *Meatus extremus.*

Alverstoke, a parish in Hampshire containing Gosport. Pop. 33,560.

Alverstone, Richard Everard Webster, Viscount (1842–1915). He was called to the bar in 1868, and became Q.C. ten years later. In 1885 he became attorney-general in the Conservative gov., though he was not a member of parliament, and had not held the office of solicitor-gene He then entered the House of Cc mons as member for Launcest He led the case as counsel for t *Times* against the Irish party befc the Parnell Commission in 1889; was British representative in t Behring Sea arbitration in 1893; ar leading counsel in the Venezue arbitration in 1899. In May 19(he became master of the rolls—position previously held by Sir Nathaniel Lindley—and was raise to the peerage. In Oct. of same yea he succeeded Lord Russell of Killowen as lord chief justice; and in 1903 he was one of the three arbitrators on the Alaska Boundary question. Resigned in 1913 through ill-health and was made a viscount.

Alvin, Louis Joseph (1806–87), Belgian poet and librarian of Brussels Library. Among his dramas are *Sardanapale* (1834), a tragedy, and *Le Folliculaire Anonyme* (1835). He also wrote *L'Alliance de l'art et de l'industrie, Life of Louis Gruyer, Souvenirs de ma Vie Littéraire, Les Recontemplations*—a reply to Victor Hugo's work, *Le Commencement de la Gravure aux Pays-Bas,* and *André von Hasselt, sa Vie et ses Travaux.*

Alvinczy, Nicolas, Baron of (1735–810), an Austrian commander, *b.* in Transylvania. He distinguished himself in the Seven Years' War, and fought against the Turks in 1789. He was commander-in-chief of the Austrian army against Napoleon, but was defeated at Arcole (1796) and at Rivoli (1797), and lost Mantua. He was made governor of Hungary, and field-marshal in 1808.

Alwar : 1. Native state in Rajputana, British India, enclosed by Gurgaon, Patiala, Nabha, and Jaipur. Area 3024 sq. m.; pop. 828,480. 2. Cap. city of A. state, lying in a valley overlooked by a fortress. Pop. 56,770.

Alyattes, King of Lydia (*c.* 610–560 B.C.), estab. the Lydian empire. He made war against Miletus and against the Medes. At the Halys, where hostilities were intercepted by the occurrence of an eclipse of the sun, peace was concluded with Media, and the river was made the boundary between the two kingdoms. He greatly extended his empire before his death. His tomb is still in existence, but has been plundered by excavators. He was succeeded by Crœsus.

Alypius (*fl. c.* A.D. 350), a Gk. authority on music and harmony of the age before Euclid. An edition of collected fragments of his writings was ed. by Mark Meibom (*Antiquæ Musicæ Auctores Septem*) in 1652. and again by Jans (*Musici Script. Græcæ*) in 1895.

Alyssum (from the Gk. λύσσα, madness, and ἀ privative, a name given because according to popular belief it cured madness), a plant of the *Crucifer order*, found in the region of the Mediterranean and in N. Asia. The plant is cultivated in various varieties, *e.g. A. saxatile*, a rock-garden variety.

Alyth, tn. in E. Perthshire and Forfarshire, Scotland, on Burn of A. 26 m. N.E. of Perth. It has woollen, linen, and jute manufs. To the N.W. lies the Forest of Alyth. Pop. 1710.

Alzey, a tn. in Hesse-Darmstadt, Germany, on R. Selz, 18 m. S. of Mainz. An anct. imperial city. Has dyeing, weaving, and brewing industries. Pop. 9220.

Alzog, Johann Baptist (1808–78), *b.* at Ohlau and *d.* at Freiburg. He was professor of ecclesiastical history at Posen (1836), Hildesheim (1845), and Freiburg (1853). His chief works are: *A Treatise on the Universal History of the Christian Church*, which has been translated into all the European languages, and a treatise on the works of the fathers of the early church.

Amadeo, Giovanni Antonio (1447–1522), It. sculptor and architect; was *b.* at Pavia. In collaboration with others, he decorated the Certosa at Pavia. His monument of Bartolommeo Colleoni, a Venetian general, with its fine bas-reliefs and statue of the commander, is one of the masterpieces of Renaissance sculpture. He also took part in the sculpture of the great dome of the cathedral of Milan.

Amadeus I. (*d.* 1078), the son of Adelaide, Marchioness of Susa, and of Humbert I., Count of Maurienne in Savoy, called 'the White-handed'; some say he was the son of Oddo, Humbert's son. After his father's death he governed conjointly with his mother the states of Susa and Maurienne. This made him master of the great pass over the Alps into Italy, by Mont Cenis, from which circumstance much of the subsequent importance of his family was derived. He married a daughter of Gerald, Count of Burgundy. A. was mainly instrumental in reconciling the Emperor Henry IV. and Pope Gregory VII., and thus putting an end to the disastrous contest between the church and the empire. He died soon after, and was buried in the cathedral of St. Jean de Maurienne.

Amadeus II. (1103–48) succeeded his father, Humbert II., Count of Maurienne. He accompanied Henry V. to Rome, where the latter was crowned emperor. As a reward for his fidelity Henry gave him the title of Count of Savoy, and vicar perpetual of the empire. A. also took the title of Marquis of Turin, and married the daughter of the Count, or Dauphin, as he was called, of Vienne, on the Rhone. A. accompanied Louis VII. of France to the Holy Land, distinguished himself at the siege of Damascus, and relieved Acre, which was besieged by the Turks. On his return from Syria he landed in the is. of Cyprus, where he *d.* at Nocosia of fever.

Amadeus III. (1233–46) succeeded his father, Thomas, as Count of Savoy, and his brother inherited Piedmont. A. obliged the Count of Genevois to acknowledge himself his vassal; he also conquered the Chablais and the Lower Valais, and sent troops over the Little St. Bernard into the valley of Aosta, and subjugated that country.

Amadeus IV. (1285–1323), called 'the Great,' succeeded his uncle Philip. By his marriage with Sybilla, Countess of Bugey and Bresse, these dists. of anct. Burgundy were united to his states, and he succeeded in otherwise extending his dominions. A. afterwards embarked for the E., where he assisted in the defence of Rhodes against the Turks in 1315. He *d.* at Avignon, where he had gone for the purpose of urging Pope John XXII. to proclaim a new crusade.

Amadeus V. (1329–42) succeeded his brother Edward, and continued the war against the Dauphin of Vienne.

Amadeus VI. (1342–83), called 'the Green Count,' son and successor of the preceding. In 1349 Humbert, last Dauphin of Vienne, disgusted with the world in consequence of the death of an only son, gave up his title and principality to Charles, grandson of Philip of Valois, and retired into a Dominican convent. A. VI. was not pleased at this cession, which gave him a much more formidable neighbour than he had before, and a war ensued, in which A. defeated the Fr. in 1354. A treaty was concluded at Paris the following year, by which the Count of Savoy gave up to France the dists. he possessed in Dauphiny beyond the rivs. Rhone and Guier; and he, on his part, was acknowledged undisputed sovereign of Faucigny and the country of Gex, as well as suzerain lord over the counts of Genevois, all which titles had been till then subjects of contention between the counts of Savoy and the dauphins of Vienne. A. also obliged the Marquis of Saluzzo to pay him homage, and thus extended his dominion on the It. side of the Alps. A.'s alliance was courted by the prin. sovereigns of his time. He next engaged alone in a crusade, restored, and then quarrelled with the Gk. emperor, John Palæologus. An in-

teresting account of this expedition from the original MSS. has been pub. by Pietro Datta, of Turin. On his return to Italy, A. found that his affairs had fallen into confusion, which, however, he soon restored, and was looked upon as the arbiter of Italy. The Venetians and the Genoese had long quarrelled about the possession of the is. of Tenedos, in the Ægean Sea, but at last agreed to give full possession to the Count of Savoy. A. in his old age was still thinking of another expedition against the Turks, but the Pope Clement VII. persuaded him first to accompany Louis, Duke of Anjou, in his expedition to Naples, to which kingdom he was called by the adoption of Queen Joanna I. A. went in 1382 and shared in the first successes of Louis, who conquered the Abruzzi and Apulia. A contagious disease, however, spread through the army, and the Count of Savoy was one of its earliest victims. He *d.* at Santo Stefano, in Apulia. He was the founder of the order of the Annonciade.

Amadeus VII. (1383–91), called 'the Red Count,' succeeded his father, Amadeus VI. He made the important acquisition of the country of Nice, by the unanimous wish of the citizens, in 1388, and the act was solemnly registered as a public document. He was killed by a fall from his horse.

Amadeus VIII. (1391–1451), son and successor of the preceding, was created first Duke of Savoy in 1416 by the Emperor Sigismund, who declared the court of the duchy to be independent of the imperial chamber. A. waged war against Phillip Maria Visconti, Duke of Milan, and took Vercelli, which he united to his dominions. He also annexed to them the country of Genevois, having purchased the rights of the various claimants after the extinction of the male line. Thus the whole of Savoy was finally united under one sovereign. He was also Prince of Piedmont, Baron of Vaud, Lord of Nizza, Mondovi, and Valenza, Duke of Aosta, etc. A. gave his subjects a code of laws called 'Statuda Sabaudiæ.' Under him Savoy enjoyed profound peace, whilst the countries around were a prey to foreign and civil wars. After forty-three years' reign, and having lost his wife, Maria Beatrix of Burgundy, he retired in 1434 to the hermitage of Ripaille, a delightful spot on the Lake of Geneva, with six of his nobles, whom he created knights of St. Maurice. He entrusted the administration of his states to his son, Louis. For five years he lived at Ripaille, and here he mediated the Peace of Arras between France and England. The council assembled at Basle, having deposed Eugenius IV. in 1439, called A. to the papal chair. A. at first refused, but being persuaded by the Cardinal of Arles, he assumed the pontifical dignity with the name of Felix V. At the same time he definitely abdicated his temporal sovereignty to his son Louis. In June 1440 the new pope proceeded to Basle, where he was solemnly crowned. France, England, Spain, Germany, and Lombardy acknowledged him as pope, whilst the rest of Italy and the Venetians supported Eugenius, who continued to reside at Rome. The schism lasted nine years, but Eugenius having died, the cardinals who were at Rome elected Nicholas V., when Felix himself proposed to renounce his rights to Nicholas, and thus terminate the scandal of the church. This arrangement was effected in 1449, and Felix having solemnly deposed the tiara, and having received the title of cardinal legate, retired again to his favourite Ripaille. He *d.* at Geneva.

Amadeus IX. (1465–72), Duke of Savoy, succeeded his father, Louis. He was called 'the Pious,' from his goodness and charity to the poor. He married Yolande of France, sister of Louis XI. He reigned only eight years, and *d.* at Vercelli. He was succeeded by his son Philibert. Louis, A.'s brother, was for a while King of Cyprus, but his title to that kingdom was disputed. As heirs of Louis, however, the kings of Sardinia still assume the title of Cyprus.

Amadeus, a salt lake of S. Australia, surrounded by mts. and desert country. It was discovered in 1872 by Ernest Giles.

Amadis de Gaula, the hero of a famous mediæval romance, owing its inspiration to the Arthurian cycle. Its date and origin are disputed, but it appears to have come from N. France through Provence to Spain, where it was well known in the fourteenth century. It survives only in a Castilian text, supposed to have been written by Montalvo towards the end of the fifteenth century. There is some evidence of an earlier Portuguese text. The oldest existing ed. appeared at Saragossa in 1508. It enjoyed a widespread popularity, being trans. into It. in 1546, into Ger. a little later, and into Fr. in 1548. Southey trans. it into Eng. in 1803.

Amadon (Old Fr. *amadour*, lover), or *Polyporus fomentarius*, is a fungus which grows on old trees, and is used [illegible] ages. Boiled in [illegible] ms the *German*

Amador de Los Rios, don José (1818–78), a Sp. writer, *b.* at Baena. His

reatest work is a *History of Spanish Literature*. He wrote besides works on Sp. art, a *History of the Jews in Spain and Portugal* and a *History of the Town and Court of Madrid*. He was professor of literature at the Madrid University and a member of the Academy.

Amagasaki, a seaport of Japan, situated at the bay of Asaka, on the Is. of Hondo. It has a pop. of about 14,500.

Amager, is. of Denmark, in the Sound, and separated from Zeeland by Copenhagen harbour. Christianshavn, on the northern end, forms part of Copenhagen. Possesses shipping and gardening industries. Area 25 sq. m. Pop. 100,000.

Amakosa, or **Ama-Xosa**, an important div. of the Bantu people. Their complexion is olive, nostrils broad, lips thick, hair woolly. They are sharp-witted and courageous. They inhabit chiefly Transkei, Tembuland, and Pondoland.

Amalaric (A.D. 506–531), the last Visigoth King of Spain, was the son of Alaric II. and grandson of Theodoric II. He was only five years old when his father died in 506, but he was proclaimed king when he came of age. He married Clotilda, daughter of Clovis, King of the Franks, which marriage led to religious disputes and a war with Childebert, King of Paris, the brother of Clotilda. The Spaniards were defeated in 531, when A. was killed.

Amaldar, a name used to designate the governor of a prov. under the Mohammedan rule in India.

Amalekites, an anct. tribe in S. Palestine, apparently connected with the Edomites, and including the Kenites, and frequently mentioned in the O.T. as foes of the Israelites. The references are disconnected and confused. The A. seem to have harried the Israelites' rear as they entered Canaan from Egypt, for which extermination was prophesied. They were defeated at various times by Joshua, Saul, David, and the Simeonites. The traditional hostility still appears in Esther.

Amalfi, seaport and archiepiscopal see, Campania, Italy, on Gulf of Salerno, 24 m. S.E. of Naples. Its situation is extremely picturesque, and it contains many interesting ruins and a fine Romanesque cathedral, dating from the eleventh century. In mediæval times A. was of great importance, being an important centre for Eastern trade and an independent republic. In 1131 it was reduced by King Roger of Sicily and later taken by Pisa, after which it rapidly declined. In 1313 much of the tn. was [illegible] flood. The chief industry, paper manuf., is now disappearing, and the harbour is little used. Pop. 5870.

Amalgam, a mixture or compound of one or more metals with mercury. As. are usually obtained by direct union or by placing the metals with mercury into dilute acid. Those containing a large proportion of mercury are in a liquid form, but if there is a small proportion of mercury the A. is frequently found to crystallise. Tin A. is used for backing mirrors; tin and zinc As. are used for coating the rubbers of electrical machines; gold and silver As. are used for gilding purposes; and an A. consisting of gold, silver, copper, tin, and mercury, in varying proportions, is used for stopping teeth.

Amalia: 1. Anna, Duchess of Saxe-Weimar-Eisenach (1739–1807), *b.* at Wolfenbüttel, the daughter of the Duke of Brunswick-Wolfenbüttel. Married Duke Ernest Augustus of Saxe-Weimar-Eisenach, and at his death in 1758 became regent for seventeen years of her son, Carl August, in whom she and Wieland, the tutor, fostered a love of art and literature. She was distinguished by her wise rule, and especially by her patronage of letters and learning. Weimar became the literary centre of Germany, and the court was free quented by Goethe, Herder, and Schiller. 2. Elizabeth, Landgravine of Hesse-Cassel (1602–51). The grand-daughter of William I., Prince o Orange. In 1619 she married William V., Landgrave of Hesse-Cassel, an after his death in 1637 ruled for man years as regent with great energy an wisdom.

Amalteo, Pomponio (1505–c. 158 an It. painter of the Venetian scho was the pupil of Pordenone. I principal works are the frescoes the castle, and in the Santa Ma Church of San Vito, and in the chu of San Francesco, Udine.

Amalthæa: 1. The nurse of infant Zeus, represented as a g and from whom was taken the c *copia* (the horn of plenty), which tomatically filled itself with what its possessor desired. 2. The who brought the nine books con ing Rome's destiny to Tarquin.

Amana, township in Iowa co., U.S.A., near Cedar Rapids. A. home of the A. Society, a religious communistic body. views and practices are closely to the doctrines of Schw and Boehme. Pop. 1500. Bertha Shambaugh's *Aman Community of True Insp* 1908.

Amanita is a sub-genus of gus Agaricus (*q.v.*). *A. musc*

poisonous plant of a bright orange-red colour, with white swellings.

Amanullah Khan, *b.* 1892, Ex-King of Afghanistan, third son of Habibullah Khan, on whose assassination he became Amir in 1919. He adopted the title of 'King' instead of 'Amir' in 1926, and his second wife, Surayya, a Damascus woman,



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whom he married in 1914, became Queen-Consort, her official style being the Shah Khanum. Made war on British forces in 1918–19. In 1928 made an extensive tour of Europe with Queen Surayya to study Western institutions, but the outcome of his reformative zeal was disastrous and he lost his throne (*see also* AFGHANISTAN).

Amapala, only port on Pacific coast, [illegible] within a few yards of shore. Silver, timber, and coffee are exported. Pop. 3000.

Amarantus, or **Amaranth**, is a genus of the order Amarantaceæ (*q.v.*). It is found in tropical and temperate climates. Some of the species are well-known British plants, e.g. *A. caudatus*, [illegible].

[illegible] cap. of Burma, [illegible] N.E. of Ava. Founded in 1783, it suffered from fire in 1810, and from earthquake in 1839. In 1860 Mandalay became the cap. and A. has now fallen into ruins.

Amarasinha (*fl.* between 500 and 1000 A.D.), a famous Hindu poet and lexicographer, was the author of a vocabulary of the Sanskrit language known as *Amara Kosha*. Little is known about him save that he was a Buddhist and that most of his works were destroyed by the orthodox Brahmans.

Amari, Michele (1806–89), It. historian and orientalist, *b.* at Palermo, and entered the gov. service. His most famous work *La Guerra de Vespro Siciliano* (1841), was prohibited, and he fled to France, where he studied Arabic and modern Gk. During the revolution of 1848 he returned to Italy, and was made vice-president of the Committee of War in Sicily, later visiting France and England on diplomatic missions. He remained in Paris till 1859, when he returned to Italy to fight under Garibaldi. He was Minister of Public Instruction, 1862–4, and professor of Arabic at Pisa and Florence till 1878, when he removed to Rome.

Amarna, a tn. of Egypt, situated on the Nile between Memphis and Thebes. It has many remarkable ruins, among which are the ruins of a temple built by Amenophis IV. In 1887 about 300 clay tablets were found inscribed with letters from the King of Egypt to Babylonia, Assyria, and other powers.

Amaru, José Gabriel Condorcanqui (1742–81), a revolutionary of Peru, and known as the 'last of the Incas.' He was leader of the opposition party to the Spaniards, but suffered defeat, and he and his house were put to death with extreme cruelty.

Amaryllidaceæ is an order of monocotyledonous plants which differ from the Liliaceæ in having an inferior ovary. They grow best in tropical Asia, Africa, and Brazil, but some are European. The perianth-leaves are in two whorls of three joined, the stamens are the same, the ovary is trilocular and inferior; many of the plants have a well-developed corona. *Narcissus pseudo-narcissus*, the daffodil, and *Galanthus nivalis*, the snowdrop, belong to this order.

Amaryllis, a genus of Amaryllidaceæ (*q.v.*), so called from virgin shepherdess of that name. *A. belladonna*, the belladonna lily, grows in Cape Colony.

Amasia, an anct. tn. in Sivas, Asia Minor, in valley of Yeshil-Irmak. Formerly court of kings of Pontus. Exports silk and salt. Pop. 25,000.

Amasis: 1. Amasis I. (*c.* 1600–1578 B.C.), first Pharaoh of eighteenth dynasty. He expelled the Hyksos

from Egypt and began conquests in Asia. 2. Amasis II. (570–526 B.C.), fifth Pharaoh of twenty-second dynasty. Fought against Nebuchadnezzar; conquered Cyprus, and had much communication with Greece.

Amateur is a word derived from the Fr., connected with 'aimer,' to love, and means one who follows any pursuit from inclination, actuated by no desire for gain. The word was at first used to denote a person who had a particular aptitude for any art, or a penchant towards a scientific pursuit. In general, it meant any one who had a taste for the fine arts. This meaning of the word is not now so often used: with the rise of professionalism in all sports, A. is employed as the antithesis of professional. The monetary consideration still forms the dividing line between the two classes in all pursuits, but no general definition can be given which would apply to all As. alike, as the governing bodies of various sports are by no means in accord as to what constitutes professionalism. Thus, the A. Athletic Association defines as an A. 'one who has never competed for a money prize or staked bet, or with or against a professional for any prize, or who has never taught, pursued, or assisted in the practice of any athletic exercises as a means of gaining a livelihood.' The rules of the A. Rowing Association are somewhat stricter. In addition to excluding any person who has competed for money, or with a professional, or taught for profit, their rules exclude also from being an A. oarsman, sculler, or coxswain any one who has ever been employed in or about boats or in manual labour for money or wages, and any one who is, or has been, by employment a mechanic, artisan, or labourer, or engaged in any menial duty. The rules of cycling differ somewhat, and certain competitions are allowed between As. and professionals. In cricket an A. is, of course, not supposed to receive monetary rewards for playing, but the number of lucrative sinecures found for clever As. has caused it to be said that the difference in their case is that an A. receives much more money than the professional. The line is somewhat difficult to draw in golf, but an A. is generally considered to be one who does not play for or accept money prizes in competitions open to professionals.

Amati (the brothers), **Andrea** and **Nicolo**, *fl. c.* 1570. They were the first of a great It. family of violin-makers and the founders of the Cremona school. Their instruments are now esteemed of priceless value. Andrea, the elder, was *b. c.* 1520, and was probably a pupil of one of the master violin-makers of Brescia—Gaspar da Salo or Maggini. In his instruments we can see the evolution of the violin out of the viol—in fact Andrea made viols as well as the newer violin. His workmanship far excels that of the older masters. Unfortunately the delicacy of the fabric he used in their manuf. has little favoured the preservation of Andrea's violins. They are strikingly original, but still preserve the antique Brescian upright sound-hole. The shape is extremely elegant, and the workmanship singularly fine. The belly and back of the violins are high in proportion to their other parts. The finish is amber varnish. This pattern produced exquisitely clear, sweet, and delicate tones, but the volume of sound was proportionately small. The tone of the fourth string was particularly weak. Andrea also made violoncellos and tenors. Nicolo, the younger brother, specialised in basses. Andrea was succeeded by two sons, Antonio and Geronimo, whose services to the craft were also signal. However, it was Nicolo, son of Geronimo, who was the greatest of the family. His violins have what the violins of the first brothers lack—intensity and richness. This was acquired by using thicker wood and reducing the elevation. The fame of their descendant has somewhat eclipsed the renown of the brothers Andrea and Nicolo, but they will always be remembered for their pioneer work in the introduction of a new craft into Italy.

Amatitlan, a dept., tn., and lake in Guatemala. The tn. of A., situated on the lake, was once a flourishing centre for the manuf. of cochineal, but changes in the dyeing processes have killed its prosperity.

Amato, Giovanni Antonio d' (1475–1555) was a distinguished It. painter. He painted in oil and in fresco, but almost all his frescoes have disappeared, and his style is very similar to that of Perugino.

Amato, or Amatus, Joannes Rodericus (1511–68), often called Amatus Lusitanus, was *b.* at Castel-Branco, Beira, Portugal, and was an eminent physician. He travelled in France, the Netherlands, Germany, and Italy, and practised his profession in Ancona till 1555, and from thence he went to Pesaro and Thessalonica (Saloniki). His two works, *Exegemata in Priores duos Dioscoridis de Materia Medica Libros* (Antwerp, 1536, called in subsequent editions *Enarrationes in Dioscoridem*, and *Curationum Medicinalium Centuriæ Septem*, show an intimate acquaintance with the writings of the Gk. and Arabic physicians, and contain curious notices

both in medicine and in natural history.

Amatongaland (Tonga Land), a portion of the colony of Natal, situated on the E. coast of S. Africa. The inhab. are chiefly Tongas, a div. of the Bantu race, and number about 40,000.

Amatrice, Colla dell', painter and architect of Naples, flourished in the first half of the sixteenth century. His work shows the influence of Raphael, Michel Angelo, and the other masters, but does not reach their level of excellence. Among his paintings perhaps the best is the 'Death and Assumption of the Virgin' in the Capitol.

Amaurosis (Gk. ἀμαυρός, dark) is total blindness where the outward appearance of the eye is unaffected, and usually caused by affections of the brain.

Amaziah, or **Amaziahu** (*c.* 838–809 B.C.), literally means 'one strengthened by Jehovah,' and is the name of the ninth king of Judah, who reigned for about twenty-nine years, succeeding his father Jehoash. He avenged his father's murder (2 Kings xiv. 5; 2 Chron. xxv. 3), and fought with the Edomites, gaining a great victory in the Valley of Salt, and taking Selah of Petra. He next declared war against Jehoash, King of Israel, but was defeated and taken prisoner. Jerusalem was also taken and plundered. A., after having recovered his liberty, was slain at Lachish, where he fled when a conspiracy was formed against him.

Amazon, the largest riv. in the world, flows through S. America. It has a great network of tribs. which drain and water a vast extent of ter. It is also designated by various savage names according to the localities through which it flows. To this riv., or a portion of it, the name Maranon is frequently applied. Though some hold that Maranon is of Indian derivation, modern geographers incline to trace it to the Sp. word *Marana*, which means 1, tangled underwood; 2, a tangled skein; and conclude that the word describes the tortuous course of the riv. or the rough country through which it flows. So also geographers tend to reserve the name Maranon for the more northern of the two head affluents of the A. The riv. was first discovered by Vicente Yanez Pinzon, a Spaniard. He called it the Rio Santa Maria de la Mar Dulce, afterwards corrupted into Mar Dulce. The word A., the most general name for the riv., is said to be derived from the Indian word Amassona, a boat-destroyer, because the riv. at certain places and in certain seasons is very dangerous, but the name may simply have been suggested by the encou[nters] of the early Sp. explorers with fighting women of savage tr[ibes]. Some difficulty in distinguishing affluents makes the exact estima[te] of the length of the riv. itself sub[ject] to dispute. The maximum le[ngth] given is 4000 m., and, with its tr[ibs.], the A. is said to possess 30,000 [m.] of navigable waterways; so gr[eat] is the volume of water dischar[ged] from its mouth, that fresh water [is] said to be found on the surface [of] the ocean, 40 m. out. The riv. a[nd] its tribs. drain an immense area, nearly one-half of S. America. T[he] prin. tribs. are the Tocantins, t[he] Xingu, the Tapayos, the Madeira, th[e] Purus, the Ucayali, the Negro, th[e] Yapura, the Nago, and the Morona. The Casiquiare, a unique natural canal, covering 180 m., connects the Orinoco with the Rio Negro, a trib. of the A., and is a most interesting natural phenomenon. The riv. with its tribs. to a large extent is navigable, but is rendered dangerous by floods and rapids, *e.g.* the tidal phenomenon called the *bore* or Pororoca in the main stream of the lower riv. The natural resources of the place have consequently been slow in development. The riv. flows through deep gorges and vast forest stretches which are but thinly populated. The climate is naturally hot and vaporous, but is rendered equable by trade winds which blow regularly through the dry season. The riv. abounds in fish, but eatable meat and fruit are difficult to procure in the locality. The A. is subject to ann. inundations. The waters rise early in Nov. and reach their maximum height in June, and then the volume decreases steadily till the end of Oct. The rise and fall of some of the affluents is not coincident. The riv. is navigable for ocean steamers for upwards of 2500 m., Iquitos, in Peru, being at the head of ocean navigation. Belém, or Pará, on the Tocati s channel, and Manaos, on the Negro, are the two chief ports. The main channel of the A., though 50 m. wide, is dangerous to navigation owing to shifting is. and sand-banks; ocean vessels therefore use the Tocatins channel 200 m. to the S. In 1867 the riv. was opened to the commerce of all nations at certain points, *i.e.* Tabatinga on the A.; Cameta on the Tocantins; Santarem on the Tapayos; Borba on the Madeira; Manaos on the Rio Negro. The forest tracts which the great riv. divides are to a large extent undisturbed. Through the tangled growths the sun scarcely penetrates, and the fauna and flora are still incompletely classified, though several scientific expeditions

have been made with that object. The most notable product of the basin is rubber, which early in the century was exported in large quantities. Being wild rubber and difficult to collect, however, it stood no chance in competition with the rubber of the East Indies as soon as the plantations came into bearing. During the Great War, therefore, when shipping was scarce and few imports could be relied upon, the inhabitants of the A. basin, turned again to the growing of sugar-cane, corn, manioc, Brazil nuts, cinchona, cotton, tobacco, ipecacuanha, sarsaparilla and vanilla, all of which are now exported, especially sugar, in large and increasing quantities. Some rubber is also exported, chiefly from Belém and Manaos. So far progress in trade and agriculture has been hampered by the difficulty of obtaining food supplies and inadequate transportation facilities. The Mamoré-Madeira railway, 220 m. in length, which was opened in 1912, has reduced transport difficulties in one direction, by circumventing the 200 m. of rapids and falls of the great Madeira. Expeditions to study the industrial possibilities of the district, as the Fleming Expedition of 1919, and that of the American Rubber Mission in 1923–24, give further promise of future development. As yet, however, the land is for the most part still virgin and very difficult of access. Further knowledge was gained of the territory in 1924, when an expedition under Dr. Hamilton Rice, explored and mapped the Rio Negro with the aid of a hydroplane. The population of the A. basin is estimated at 1,500,000.

Amazonas: 1. The northernmost and largest prov. of Brazil and a federal state of the republic. It is watered by the Amazon, and has an area of 742,123 sq. m. The country for the most part is plain-land, covered with vast undisturbed forests, and subject to annual flooding. The chief products are india-rubber, Brazil nuts, and cacao. Valuable vegetable products are also found. The cap., Manaos, is a flourishing tn. 2. A northern prov. of Peru. Area 13,943 sq. m. The natural barriers of the country greatly impede trade, though Chachapoyas, the cap., has a fine cathedral and university. Pop. about 80,000. 3. A ter. in extreme S. of Venezuela, adjoining 1. It is drained by the Orinoco and Rio Negro. It is covered with dense forests. Cap. Maroa.

Amazons, a mythical race of warrior women, associated with the riv. Thermodon in Cappadocia. They had no males in their tribes, and their unions with their male neighbours were only temporary and for the sake of the procreation of children, among which male infants were destroyed or banished. In Homer the A. are said, in the reign of Iobates, to have invaded Lycia, but were conquered by Bellerophon. One of the labours of Heracles was to seize the girdle of the A. queen, Hippolyte. Among the most famous of the legends of the A. are those of their alliance with Priam in the Trojan War and of their invasion of Attica. In the former adventure, Queen Penthesilea was an ally of Priam, but was slain by Achilles. The grief of Achilles when he discovered his victim was a favourite subject of anct. art. In the latter adventure they were defeated by Theseus, and their queen, Antiope, had a son, Hippolytus, by him. The Amazonian legends seem to have grown out of the warlike attitude of the women of the savage Thracian tribes—women much freer and more robust than the women of Greece. In art they are represented with the right breast bared.

Ambala, the name of a dist. of N. India and the chief city therein. Here was ratified, in 1869, the treaty between Lord Mayo, governor-general of India, and the Amir Shere Ali of Afghanistan. The tn. has many fine public buildings.

Ambassadors, diplomatic envoys sent by a king, or the head of a great state, to represent him to a foreign gov., negotiate his affairs, and guard the home interests abroad. He bears credentials in the form of a sealed letter addressed by the sovereign who sends the embassy, by which it is understood that his negotiations will be regarded as if transacted by the sovereign himself. Tradition has estab. it that only important kingdoms and states are at liberty to negotiate by means of A. proper. Lesser states negotiate by means of ministers of the second rank. An A. is distinguished from a minister of the second rank by the right of transacting his negotiations in the king's presence in public and private, but in practice the sovereign with whom he has transactions is always attended by a few of his ministers. As representing the person of the sovereign, an A. is entertained at the foreign court with great ceremony and pomp. He is not subject to the laws of the state wherein he is resident, and the exemption applies also to his suite, but violent abuse of this privilege may lead to his recall.

Ambeer, or Amber, the anct. cap. of Jaypur, Rajputana, India, about 5 m. from the city of Jaypur, the present cap. It is now in ruins, which are a testimony of its former splendour.

Amber, a resinous fossil. The name is Arabic, but has reached us through the Sp. Thales, one of the seven sages of Greece, discovered its power of attraction when subjected to friction. Friction really generates in amber negative electricity, and the word electricity is itself derived from the Gk. word ἤλεκτρον, meaning amber. A., though now obtained like a mineral product, was originally a distillation from an extinct coniferous tree. It frequently preserves within itself plant-structures and insects. The Gk. legend is an explanation of its resinous origin. A. among the ancients was said to be the tears of the sisters of Phaethon, who, on account of their grief for his death, were ... into poplars. A. ... rying greatly in ... h tints occur wh ... Sometimes A. is transparent and sometimes opaque. The cloudy appearance is caused by imprisoned bubbles. The chemical formula is $C_{10}H_{16}O$. Succinic acid is obtained from A. by dry distillation, and it is this that produces the aromatic odour familiar to those who have burned the substance. A. is obtained in greatest quantities at the Baltic. After storms quantities of A. are found cast up on the shore. Systematic dredging and mining operations are carried on in the sea and in the 'blue earth.' A. has a wide distribution, being found in varying quantities in Europe, Autralasia, and America. A., when immersed in a hot oil-bath, becomes soft, and pieces of it may be fused by dipping the required parts in ho... largely used ... vases, mout... artificial A. ... composed of copal, camphor, and turpentine, which is detected by the fact that it melts in cold ether, whereas real A. remains unchanged.

Amber Fish, a dark-coloured fish of genus *Seriola* with decurved snout.

Amberg, a tn. of Germany, in Bavaria, and once the cap. of the Upper Palatinate. It has fine buildings and many thriving industries. Pop. 26,330.

Amberger, Christoph (*c.* 1490–1563), a Ger. painter, was *b.* at Nuremberg and *d.* at Augsburg. He painted in oil and in fresco chiefly portraits, the most important of which are: The Emperor Charles V. (1532), Berlin Museum; Hieronymus Sulzer (1542), Gotha; Sebastian Münster (1552), Berlin Museum; 'A Portrait of a Man,' Brussels Museum; and a Madonna in the cathedral of Augsburg.

Ambergris, a fatty substance excreted by the sperm whale, probably a pathologic product. It has a fragrant musky odour when warmed, and is used in perfumery and also as a medicine in catarrh and nervous diseases.

Ambert, an industrial tn. in Central France. Its chief historic interest is an old church of the fifteenth century. Pop. 7091.

Ambianum, the Lat. form of Amiens, used in documents and in bibliography.

Ambidexterity, the capacity of using both hands indifferently. Some philosophers maintain that man is born ambidextrous, and that the habit of using the right hand in preference to the left is acquired. An argument against this theory is the fact that nearly all savage peoples use the right hand more than the left. A. is cultivated in certain schools of drawing.

Ambleside, a market vil. in the Lake Dis... It is picturesq... is surrounded ... It has many lit... In its vicinity a... famous house of ... How, a summer re... Arnold; and the Knoll, the home of Miss Martineau. It is an attractive resort for tourists. Pop. 2876.

Amblygonite, a mineral similar in appearance to felspar. It is a lithium and aluminium fluophosphate, $Li(AlF)PO_4$, and is used in commerce for the extraction of lithium.

Amblyopia, dimness of vision not due to refractive errors or organic disease of the eye. It may be congenital or acquired. In the latter case it is sometimes due to hysteria, but more often to the use of tobacco or alcohol, and in some cases to other drugs, or lead poisoning. The condition is progressive and may ultimately, though rarely, lead to total blindness. The centre of the field of vision is most affected, and there are blind spots for both red and green. The cause is said to be retrobullar neuritis or inflammation of the eyeball part of the optic nerve. The treatment consists in rest and nourishment of the system, and the abandonment of the predisposing cause, if it be the use of tobacco, alcohol, or other drugs.

Amblyopsis (Gk. ἀμβλύς, obtuse, ὤψ, eye), a bony fish found in Kentucky. Its name arises from the condition of its eyes, which are covered by the skin.

Amblypoda, an extinct species of mammal which had five toes on each foot ending in hoofs and not nails. A. belonged to the Eocene period. In size they were not less than the elephant. Remains of the group are found in Eng. soil, but the best specimens have come from N.

America. A. were represented in Europe by the Coryphodum.

Amblypterus (Gk. ἀμβλύς, obtuse, πτέρυξ, wing), a genus of fossil Ganoid fishes of the order Heterocerci and family Palæoniscidæ, found in the coal formation of Edinburgh.

Amblystoma (Gk. ἀμβλύς, obtuse, στόμα, mouth), a genus of salamanders of the order Urodela, found in N. and S. America. The larva of *A. tigrinum* is the axolotl, which at this stage may become sexually mature and lay eggs; it occurs in the U.S.A., Vancouver, and Mexico. Some axolotls never normally metamorphose into As., but may be made to undergo the change by administration of thyroid gland.

Amblyurus, a genus of fossil Ganoid fishes found in the lower lias of Somersetshire.

Ambo (Gk. ἄμβων, from ἀναβαίνειν), the reading-desk of early basilican churches, superseded by the pulpit.

Amboise, an historic Fr. tn. on the Loire in the dept. of Indre-et-Loire. It is situated amid beautiful vineyards and gardens, and the country is called the Garden of France. The castle of A. is of great historical interest. It embraces the famous Logis du Roi, built by Charles VIII., and the chapel of St. Hubert, containing the remains of Leonardo da Vinci. Many other beautiful specimens of mediæval architecture are in the tn. It is the scene of the conspiracy of A., a disastrous Huguenot plot, 1560, and of the edict of A., 1563, conceding freedom of worship to the Huguenots.

Amboise, George d' (1460–1510), a Fr. cardinal and statesman. He came of a noble family of Fr. diplomats. As a youth he attached himself to the Duke of Orleans, and through his influence was made Archbishop of Narbonne and subsequently of Rouen. On the accession of the Duke of Orleans to the throne as Louis XII., A. was made cardinal and prime minister. His foreign and domestic policy were moderate and beneficial. On the death of Alexander VI. he aspired to the papal see, but failed, and the remainder of his life was [illegible] schemes. He d. at Lyons after returning from an It. invasion. He was buried at Rouen, where a fine tomb was erected.

Amboyna [illegible] Residency [illegible] Government of the Moluccas [illegible] and Europeans.

Ambracia, a tn. of anct. Epirus. It was colonised c. 640 B.C. by Corinth. It became a democracy, but retained strong allegiance to Corinth. In the Peloponnesian War it played an important part. During the Macedonian supremacy it was autonomous, but eventually became the cap. of Pyrrhus's kingdom.

Ambree, Mary, the heroine of one of the ballads in Percy's *Reliques*. At the siege of Ghent she distinguished herself as a soldier and fought against the Spaniards to avenge the death of her betrothed. Her name occurs sev. times in the plays of Ben Jonson, and was used as a synonym for a virago.

Ambridge, a bor. in Beaver co., Penn., U.S.A. Pop. 12,730.

Ambriz, a Portuguese seaport of W. Africa. The tn. has free-trade facilities, and exports the produce of the numerous plantations of the dist., principally vegetable oils.

Ambrose, St. (c. 340–97), one of the most famous fathers of the church, was b. at Trèves, where his father was prefect of Gaul. He shares, with others, the legend that a heaven-favoured career was predicted for him by the omen of bees swarming on his lips in infancy. He rose to the position of prefect, with headquarters at Milan, and succeeded to the bishopric of Milan in the year 374. The anniversary of his acceptance of this honour is now marked with a festival in the Catholic Church. In his new capacity he was scrupulously pious, and renounced his wealth and former connections. He was no respecter of persons, and did not hesitate to excommunicate for a time Theodosius, emperor of the E., on account of his consent to the massacre of the Thessalonians. A., as president of the synod at Aquileia in 381, won a memorable victory over the Arian heretics. He also successfully opposed Aurelius Symmachus, who had presented to Valentinian II. a petition for the restoration of [illegible]

Ambrosia, [illegible]

and A. was said to be able to bestow immortality on mortals, as in the case of Tithonus and Berenice. A. was also applied to wounds in story, and used as an unguent for the hair.

Ambrosian Chant, the name given to the collected music of the early church, arranged by Ambrose, Bishop of Milan, in the fourth century. Of these chants we have no extant specimens, or, if we have, they are indistinguishable from the Gregorian chants of Pope Gregory, by which they were superseded in the sixth century.

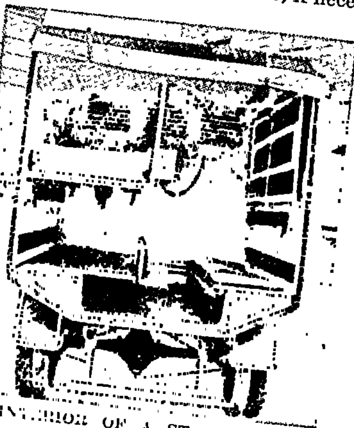
Ambrosian Library, a famous library at Milan founded (1609) in memory of St. Ambrose by Cardinal Borromeo. It numbers 400,000 vols. and 10,000 MSS. Among its most famous possessions are a Gk. Pentateuch, fifth century, a Josephus on papyrus, a Plautus, and a commentary on the Psalms by St. Jerome.

Ambrosius, Aurelius, flourished in the fifth century. He was king of Britain, and drove the Saxon invaders under Hengist and Horsa to the Is. of Thanet. He is said to have been of Rom. stock in the *Historia Brittonum*. Geoffrey of Monmouth, however, calls him a son of Arthur.

Ambrosius, Johanna (*fl.* c. 1854), *nom de plume* of Johanna Voigt, a Ger. poetess of the peasantry. Her poems have been trans. into English by Mary Stafford, 1896.

Ambry (Lat. *armarium*, Fr. *armoire*), a cupboard or niche in a wall to hold utensils, etc. It is sometimes written in the form almery, being confused with almonry and taken to mean a place for alms. The word is usually applied to a locker in churches wherein were placed sacramental vessels, vestments, etc. In its corrupt usage the word was formerly applied to the almonry of Westminster Abbey.

Ambulance (from the Lat. *ambulare*, to go, through the Fr. *hôpital ambulant*), a conveyance in which the disabled in battle or in civil life are removed to hospital, or in which patients are treated in default of hospital wards. For field use A. wagons were first introduced by the Fr. as late as the end of the eighteenth century. Larrey (1766–1842) was the inventor, and had the fervent support of Napoleon. Improvements were made by the Fr. on the method of Larrey, *e.g.* a corps of stretcher-bearers was organised. In the Crimean War the British had no systematic A. corps, and attention to this dept. was only given after Lord Herbert's Commission of 1857–8. This method of first aid was subsequently adopted by other powers, and by the convention of Geneva (1864) the patients and the A. staff were secured neutral protection. The A. wagon of the British army prior to the Great War was a canvas-covered vehicle marked with the Geneva Cross, and is now constructed to hold four stretchers and six men seated. It is light and adaptable for quick transport. During action stretcher-bearers pick up the wounded man as he falls, and he is then treated with first-field dressing. Thereafter he is carried on an A. wagon of the first line of assistance to the dressing-station. Should his wounds be of a serious nature, he is removed in a wagon of the second line to the field hospital. Thence, if necessary, he is conveyed to the general hospital or home in a hospital ship. Various independent charitable societies render A. aid in time of war. A civil A. association was first organised in England in 1878 by the Knights of St John. This society provided training in first aid, that assistance might be at hand for those who sustained injuries in civil life. The success of the enterprise led to the formation of A. corps in all parts of the country, and now policemen, railway-men, and factory employees hold certificates of the association. This society also provides auxiliary relief forces which co-operate with the Royal Army Medical Corps in treating the injured and wounded in time of war. The evolution of A. work has been rapid and a notable success.



INTERIOR OF A ST. JOHN'S AMBULANCE

Ambulatory, in architecture, the space enclosed by a colonnade or an arcade. It is the name used for any part of a building intended for walking in, as the aisles of a cathedral or

rch. In the peripteral temple of Gks., the lateral or flanking por-oes are properly termed A.; and cloister of a monastery is sur-inded by an A.

Ambuscade (older form 'embush.' ne word comes through the Old Fr. *nbusche*, from the It. *imboscata*, self from *in* and *bosco*, a wood). As ne derivation shows, this term origin-lly signified a military manœuvre whereby troops were concealed in wooded ground in order to make a covert attack on the enemy, but now the word is more loosely used to denote a surprise attack of any de-scription. An A. is an obvious manœuvre of self-defence and is em-ployed in the most rudimentary war-fare. Ditches, trenches, and covers of that nature are merely develop-ments of this simple ruse. The great advantage to be derived from an A. is the fact that by its skilful manipu-lation a small company of men may gain the supremacy over troops which far outnumber them. The wide range of modern appurtenances of war and more advanced military tactics has made the employment of the simple ambush useless.

Ameer, *see* EMIR.

Ameland is one of the Friesian Is. situated off the coast of Friesland, Holland. The people are mostly fishermen. Pop. 3000.

Amelcorn, seed of a grass-like spelt grown in Switzerland for starch.

Amelia: 1. A port on Pemba Bay on the E. coast of Africa and cap. of Portuguese Nyasaland. 2. An is. in Nassau, Florida, U.S.A., about 17 m. long.

Amelie-les-Bains, a coast tn. of S.W. France in the dept. of Pyrénées-Orientales. The sulphur springs were famous in anct. times, and remains of Rom. baths are still to be seen. The resort is frequented in summer and winter by sufferers from rheumatism and consumption. In 1840 the name of the place was changed from Bains d'Arles in honour of Queen Marie-Amélie. Pop. 1247.

Amen, a Heb. liturgical word of affirmation. It is used as a response at the conclusion of a doxology, prayer, etc. Justin Martyr is the first of the fathers who speaks of this use of the response. The word varies in meaning according to its position. It has usually a final or detached position, and signifies 'So let it be.' The use in the gospels of the double amen (or more frequently the double A. trans. in the A.V. 'verily, verily') is peculiar. The 'fiat' force of the word is there lost, and it serves merely to lay stress on some important statement about to be made.

Amende Honorable was in the old Fr. laws a public confession made by persons guilty of crimes coming under the head of public scandals, and was accounted an infamous punishment. It might also be a public acknowledg-ment of an injury to the reputation and honour of another; and in Eng-land the expression is used when a person publicly admits any wrong done to another.

Amendment, a legal term signify-ing the correction of mistakes in the written records of judicial proceed-ings. For A. in the sense used in parliament and public meetings, *see* PARLIAMENTARY PROCEDURE. In anct. times, after the proceedings were once entered on record, the judges considered that they had no authority by the common law to alter them in any respect, how-ever trifling. This led to much in-convenience, for it frequently hap-pened that one of the parties to a suit would discover some blunder in the record made by the officer of the court, and by bringing a writ of error de-prived the successful party of all benefit from the judgment. The judges would appear to have been guided to this rigid observance of words by an ordinance of Edward I., which directed them to record the pleas pleaded before them, but for-bids them 'to make their records a warrant for their own misdoings, or to erase or *amend* them, or to record anything against their previous enrol-ments.' The inconvenience of this rigid adherence to this ordinance led to a series of enactments called statutes of amendment and statutes of *jeofails* (*jeo fail* or *j'ai faillé*), by the former of which authority was given to amend certain specific errors in the records, and by the latter judges were empowered to proceed to judgment notwithstanding such errors. The tenacity with which judges clung to their position of refusing to alter even the error of a letter in record or in-dictment (a position entirely laudable in principle) necessitated amending statutes from the time of Edward III. to the present day. Almost any A. is now allowed in civil causes, provided that the amendment does not subject the defendant to a larger pecuniary liability or embarrass or surprise him. In criminal causes the practice is more stringent, and once the indictment has been formulated at the assizes no A. is allowed. This stringency does not apply to the earlier stages of a criminal cause in the magistrate's court, and it is for this reason that defence is so often reserved till after the committal of the prisoner to the assize court. The present law and practice of the courts is based mainly upon the Judicature Act, 1873, and

in Scotch courts, on the Court of Sessions Act, 1868.

Amenhotep, the name of four Pharaohs of Egypt. A. I. (*c.* 1570 B.C.) was the son of Amasis I., conquered Ethiopia and subdued the Libyans. A. II., son of Thothmes III., *fl. c.* 1450. He devoted his reign to composing his kingdom and improving the architecture. A. III., son of Thothmes IV., *fl. c.* 1410 B.C. He also devoted his reign to building. He constructed the great temples at Thebes, of which the ruins of the temple of Luxor remain. The Vocal Memnon, mentioned in Herodotus and Tacitus, was built for him. A. IV. was the son of an alien mother and the husband of an alien princess. He tried to subvert the anct. constitution and to introduce exotic rites. After his failure he reigned peaceably.

Amenophis, or **Ammenophis**, the name of four famous early Pharaohs of Egypt, usually written of under the name of Amenhotep (*q.v.*).

Amenorrhæa, a medical term used to denote the diminution or absence of the menstrual flux in women. It is caused by general debility of the system, shocks caused by chills or from the emotions, or by more serious internal disorders.

Amentaceæ, a name sometimes applied to several orders of plants which bear catkins, in which are the poplar, birch, hazel, and willow. The flowers are arranged in a dense, cylindrical, deciduous spike called an *amentum*—hence the name.

Amenthes, the lower world of the anct. Egyptians. Thither the dead were conducted by the goddess Ma, and judgment was passed by Osiris on their deeds.

Amercement, or **Amerciament** (from the Fr. *à merci*, from the Lat. *merces*, payment), a term in Old Eng. law used to denote an arbitrary pecuniary forfeit imposed on an offender by a jury of his equals in status, or if in the supreme courts, by the coroner. The amount of the pecuniary penalty was quite arbitrary, and was originally an lternative for a forfeiture of goods. he word in modern usages has ractically lost its old technical sense, nd is confined to poetical phrase- ogy, where it has merely the mean- g of a loss, fine, or deprivation of y kind.

America. The general name given the two continents which form the stern hemisphere, extending ap- ximately from beyond 75° N. lat. below 55° S. lat. The name, ved from Amerigo Vespucci), who only reached the mainland N. A. several years after the overy of the New World, is an orical accident. At the present day, 'America' and 'American often used as synonymous with United States of America, an citizen of that nation respectiv As applied to both N. and S. A. name is also anomalous, for the continents have little in common a are all but disconnected physica Geologists, seeking an explanation the grouping of the continents of t world in the tetrahedral deformati of the earth's crust, afford some jus fication for treating N. and S. A. as single geographical unit. There i however, a recognised tendency in a land masses to assume the form o pyramids, with their vertices directe towards the S. This is strikingly exemplified in the form of both N. and S. A. Again, in some respects the general outlines of both are similar, and both have ranges of volcanic mts. in the W. running almost due N. and S., and both are watered by similar great rivs. The physical features of both are on a vaster scale than the physical features of Europe. The rivs. are extremely long, the lakes very large, the prairies or 'llanos' extensive. For the rest, however, the diversities are so great that it is more convenient to treat them separately. For the geology, ethnology, fauna and flora of A. *see* NORTH AMERICA; SOUTH AMERICA; for physical features, climate, products, manufactures, forms of government, history, etc. *see* CANADA, MEXICO, UNITED STATES OF AMERICA, and the various countries of CENTRAL AMERICA; and ARGENTINA BRAZIL, CHILE and other countries of S. America.

America Cup, The. A silver cup captured at an English Yacht Race in the year 1851 by an American yacht called *The America*, and since offered as an International Prize to any yacht-owner of another nation who can win it under certain rather severe rules. Many unsuccessful attempts have been made by British yacht-owners to bring the trophy back to England. Sir Thomas Lipton, the strongest champion of all, has built and raced no fewer than five yachts. *Shamrock IV.* was beaten in 1920 and after ten years' interval *Shamrock V.* failed in 1930.

American Association for the Advancement of Science was the name given in 1847 to the new organisation of the former 'Association of American Geologists and Naturalists.' The first meeting of the new Association was held on Sept. 20, 1848, and at this meeting the rules were drawn up. The objects of the Association are 'by periodical and migratory meetings, to promote intercourse between those who are cultivating science in different parts of the

U.S.A., to give a stronger and more general impulse and a more systematic direction to scientific research; and to procure for the labours of scientific men increased facilities and a wider usefulness.' Members may be chosen from among the Collegiate Professors of Natural History, Physics, Chemistry and Mathematics, and Political Economy, and of the Theoretical and Applied Sciences generally; also civil engineers and architects who have been employed on the construction or superintendence of public works. In addition, a number of independent organisations and societies are affiliated, and these meet, at about the same time as the larger Association, for the reading of papers, etc. The activities of the Association cover a variety of subjects under the following heads: agriculture, astronomy, anthropology, botany, chemistry, economics, education, engineering, geology and geography, history, mathematics, medicine, philology, physics, psychology and zoology. The large income which accrues from the permanent endowment of the Association is mainly granted in aid of scientific research. The headquarters of the Association are at the Smithsonian Institution Bldgs., Washington. The present number of members (1930) is 18,500.

American Civic Association, formed in 1904 by the amalgamation of the American League for Civic Improvement and the American Park and Outdoor Art Association. Its object is to combine and render efficient all effort for civic betterment. It claims *inter alia*, to have prevented the destruction of Niagara Falls for power purposes, and it conducts campaigns against objectionable outdoor advertising and against the 'typhoid' fly, and fosters parks and playgrounds. Among other activities may be mentioned the planning of parks and boulevards, the abatement of smoke in towns, tree-planting and town-planning.

American Civil War, *see* U.S.A.

American Federation of Labour founded in 1881, in Pittsburgh, Pennsylvania. Its membership was open to all workmen, mechanics, or labourers, and its chief objects were to shorten the working day and to obtain a higher rate of wages. No distinction of nationality, creed, or colour—an important condition in the States—was to affect the rights of membership. By its ceaseless agitations, the Federation has effected many urgent and far-reaching reforms, such as the compulsory education of the young, compensation for accidents to employees in industry, and health and sanitary regulations for all workers. The suppression of competitive convict labour and the restriction of alien immigration are also the results of its labours. During the Great War of 1914–18 the Federation gave whole-hearted support to the proposals to defend the U.S.A. against all enemies by advocating the personal services of its members. It endeavours to maintain cordial relations with the labour organisations of other countries. There is now a labour department and free employment bureau in each of forty-nine American states. Its official organ is the *American Federationist*.

American Indians, the aboriginal population of America. The application of the word Indian to this race is a misnomer due to Columbus' belief that he had found a new route to India. The name was preserved, only subsequently American was added to distinguish the people from the quite different races of India. Some ethnologists have coined a new word, 'Amerind,' which name has some currency. With the exception of the Eskimo race, the divers tribes of A.I. are remarkably uniform in type, and even the Eskimo and Indian tribes have at least kinship in language, *i.e.* the various languages are characterised by 'long words' whereby a whole phrase or sentence is compressed into one long compound. Such a language is called holophrastic.

Ethnology.—The average Indian is marked by abundant straight black hair, not frizzled and woolly; copper-coloured skin (hence the name 'Red-skin' and 'Red-man'), a peaked skull, aquiline nose, prominent jaw, and tall, massive frame. He is naturally serious in his views of life. In character he is brave, proud, and generous, but very vindictive. Ethnologists for the most part agree that the aboriginal inhabitants of America are of Asiatic descent. In the region of the Bering Strait the two continents approach very close together and the passage is simple. Moreover, resemblances in physique, language, and customs all point to racial unity. The contact with European races of the A. I. was for long very destructive to the latter. The atrocities committed by the Sp. pioneers have long been a subject of shame to all white peoples. The A. I. do not easily withstand diseases not endemic, and countless natives succumbed to plagues introduced by the Europeans. Fire-water (alcohol) had fatal effects on the constitution of the aboriginals. Whole tribes were thus exterminated, and the great percentage of those

who survived lost the civilisation that had reached a considerably high level in their free days and lapsed into savagery. Later the cruelties which had been inflicted on the people were recognised, and a new treatment was organised, which unfortunately proved almost as vicious as the old. The donation of annuities to deported tribes only effected degeneration and pauperisation. Of the pure-blooded A. I. not very many remain. The natives have ... nost every race. ... it very difficult ... ructure of pure

Arts and Crafts.—The main employments of the people were agriculture and hunting. Before the advent of the Spaniards, beans, melons, potatoes, Indian corn, tobacco, cotton, were all cultivated systematically. Hunting was facilitated by means of intricate and ingenious snares and nets. Spears, bows and arrows, harpoons, and clubs were the chief instruments employed. Sledges and skin-boats (coracles) were the chief means of transportation, and wheels were but little used. Arts and crafts were developed to a high degree. Spinning and weaving were practised with no mean skill. Shells were strung in patterns with or without the addition of porcupine quills. The glass-bead work so often exhibited among native articles is of a much later development. The materials for this work were introduced by the Europeans, and the nature of the work is very tasteful to the Indian. Gold, silver, and iron were worked and manufactured into utensils and various articles of personal adornment. Painting, too, had reached considerable development and adorned articles made of skin, bone, and pottery. But the art that was nearest and dearest to the A. I. was the art of music. Music echoed every phase in the life of the native, and was thus of a very diversified character. There was gruesome war music, wild dance music, sweet love music, thrilling hunting music, and music for seed-time and harvest, music to which to eat, to sleep, and to perform all the little duties of ordinary life, however humble. No other peoples have music with such a wide range. The chief musical instruments known to the Indians, before the advent of the white, were drums, flutes, and rattles.

Religion.—The religion of the A. I. is on the whole pantheistic, yet in certain respects it approaches very near monotheism. Divine power is manifest in all the operations of Nature, revealing itself in energy. This power ... ately worshipped ... rious phases in ... tself, and a sort ... All the minor spirits had to be honoured and appeased with their own appropriate worship. But sometimes this divine power was regarded in its oneness as the principle and origin of all life, infinite in power and eternal in duration. The A. I., inasmuch as he recognised an omnipresent, omniform God, regarded everything in the light of religion; and just as in his love of music he considered no experience unworthy of musical expression, so, too, in his religious ... aspect of natu ... pale of divine ... in fact is the ... ed as being immortal, inasmuch as it was a portion of the life-principle, itself indestructible. In addition to their recognition of this divine power dominating all that is, most tribes recognised their own peculiar demi-god. This demi-god was for the most part beneficent and benevolent, and was the guardian of the welfare of the race. He was the embodiment of the principle that makes for righteousness, and herein lies the great superiority of the religion of the A. I. over most savage religions—the development of the race was regarded as progressive and not retrogressive.

Social Organisations.—Social organisations varied according to the nature and state of advancement of the divers tribes. Sometimes the state was almost communistic in principle, sometimes the powers of chieftainship were absolute. The race on the whole was monogamous. No traces can be found of human sacrifices and cannibalism. Such was the state of civilisation among the A. I. before the advent of the white men—a state far removed from savagery. In a very few years this state of civilisation entirely disappeared, leaving only a few traces in names and expressions adopted by the European. The old Indian trails were used by the white settlers and greatly facilitated their progress in the W. Too much stress cannot be laid on the debt the white men owe the red in this direction. So sudden was the reversion of the A. I. to savagery, so rapidly did their numbers decrease, that it was long before their ancient civilisation was realised and attempts were made to reclaim their fallen state. Cortez and the early Sp. invaders totally ignored their claims to humane treatment, though he witnessed the highest level of civilisation and advancement among the Indians. The Sp. pioneers

of the Indians of to-day are farming and the raising of cattle and horses; while many are engaged in the making of blankets and pottery and in embroidery, their chief market for the sale of their handicrafts being among tourists.

American Institute of Social Service, organised in 1898 to gather and spread information in all branches of social thought and service. Publishes *The Gospel of the Kingdom*. Headquarters, Astor Place, New York.

American Law, *see* UNITED STATES OF AMERICA—*Law; see also* ACTION; EVIDENCE; etc.

American Legion, an organisation of American ex-service men, somewhat similar to the British Legion, with patriotic and other motives of a high order. It was inaugurated in 1919. The idea originated among the troops in France. All ex-servicemen who served between April 6 1917, and Nov. 11, 1918, in the naval and military forces of U.S.A. or associated powers are (generally) eligible for membership.

American Literature, *see* UNITED STATES OF AMERICA—*Literature.*

American Peace and Arbitration League, organised to promote universal peace by conciliation and arbitration through a permanent international court, arbitration between all nations, and adequate armament for national security.

American Scenic and Historic Preservation Society, founded by Andrew H. Green, and incorp. 1895, for the protection of natural scenery, the preservation of historic landmarks, and the improvement of cities. President, George E. Kunz, Ph.D.

American War of Independence, *see* UNITED STATES OF AMERICA—*History.*

Americanism, a word or phrase originating among the people of the U.S.A., and obtaining general currency there. Some so-called Americanisms are merely English words which have had applied to them a different meaning from that in use in England. For instance 'corn' in America is applied only to Indian maize, whereas in Great Britain it is applied to all cereals. Some other Americanisms are of perfectly good English origin, but have dropped out of current usage in Great Britain. Where English people use the word 'autumn' of Latin origin, Americans commonly use the old pure English word of 'fall,' which is at once more apt and more poetic—the time of the fall of the year, the time when the leaves fall. Similarly Americans say 'guess' for 'think,' 'hefty' for 'sturdy' or 'stalwart,' 'fetch' for 'bring.'

In another sense Americanisms reveal the story of the colonisation the territory that is now the U.S.A. [illegible] various European nations, and al[illegible] of the relics of the native America[illegible] Indians whom they dispossesse[illegible] Thus of Indian origin are such com[illegible] mon words as 'canoe,' 'hominy[illegible] 'tomahawk,' 'pemmican,' 'tobog gan,' 'pow-wow,' 'wig-wam,' and th[illegible] very expressive English word th[illegible] Indians invented to describe whisky 'fire-water.' Traces of French colonisation in the U.S.A. are shown by words like 'prairie' and 'bayou.' The Spaniards left their mark in words like 'mustang,' 'adobe,' 'canyon' 'mesa.' But the greater part of Americanisms is of purely American origin, growing out of the life of the people, their business, their politics, which are different from those in England. American trade has altered the stereotyped vocabulary by a system of curtailed words, or words illustrating new methods of commerce. Americans have decided inventive genius, and have been just as skiful in creating new names for their new discoveries. The number of patented articles in America is enormous, and many of those have their own made-up names which have passed into current usage. There are many Americanisms which originate as mere slang expressions, then become generally current in America, and finally secure a place even in the English language as spoken in Great Britain. Such are, for instance, 'boodle' for money obtained illegally, particularly by politicians; 'bunkum platform,' for a political party programme; 'plank,' for an important section of that programme. The prohibition law in America, and the consequent and successful attempts to evade it have given rise to a whole series of new words. Thus 'blind tiger' means a place where alcoholic liquor is sold despite the law; 'bootlegger' is a man who makes a profession of selling liquor illegally; 'hooch' is the name generally given for the stuff that is sold as whisky in the U.S.A. since prohibition came into force.

There are many Americanisms which are to-day in the transitional stage. Now they are mere slang. To-morrow they may be universally adopted or drop out entirely. The origin of many of these is obvious. Thus 'also ran' means an unsuccessful contestant, evidently adapted from the racecourse term. 'Boll-weevil,' from being the name of a pest that destroys the cotton plant, has evolved into a term for any obnoxious person. 'Tight-wad' means a stingy person, obviously because he keeps his wad of paper money unspent.

Amicis, Edmondo De (1846–1908), It. novelist, essayist, poet, and writer of travel-books. He was master of a delightful style, and in some of his works, especially his books of travel, exhibits remarkable descriptive powers. His chief publications are *Bozzetti della Vita Militare*, 1868; *Novelle*, 1872; *La Spagna*, 1873; *Ricordi di Londra*, 1874; *L'Olanda*, 1874; *Marocco*, 1876; *Constantinopoli*, 1877; *Ricordi di Parigi*, 1879; *Poesie*, 1880; *Sull' Occano*, 1889; *Il Romanzo d'un Maestro*, 1895; *Il Primo Maggio*, *La Carozza di Tutti*, 1899; *Memorie*, 1899; *Speranza e Gloria*, 1900; *Ricordi d'Infanzia et di Scuola*, 1901; *Una Tempesta in Famiglia*, 1904; *Nel Regno del Cervino*, 1905; *Ultime Pagine*, 1908; and *Il Cuore*.

Amicus curiæ (Lat., a friend of the court), a legal term denoting a disinterested person who, at the hearing of a case, informs or corrects the court.

Amides, *see* ACID-AMIDES.

Amidines, organic compounds corresponding to the formula



$$R{\cdot}C(:NH){\cdot}NH_2,$$

where R is a radical. They may be regarded as being derived from the acid-amides by replacing the oxygen by the group NH. They may be prepared by the combination of nitriles with ammonia and primary amines. The chief A. are *formamidine*, *acetamidine*, and *benzamidine*.

Amiel, Henri Frédéric (1821–81), a Swiss philosopher, *b.* at Geneva. In 1841 he became professor of æsthetics at the Geneva Academy. He afterwards became professor of moral philosophy in the same university. The work which secures his fame is the *Journal Intime*, which Mrs. Humphry Ward trans. into Eng.

Amiens, an anct. city, cap. of the dept. of Somme, N. France, and situated on the Somme at its confluence with the Arve. The chief interest of the city is Notre Dame, its magnificent cathedral, the most perfect specimen of Gothic architecture in France, dating from the thirteenth century. This splendid structure is embellished with a wealth of magnificent mediæval sculpture. Viollet-le-Duc happily calls this cathedral 'the Parthenon of Gothic architecture.' The nave of this church is remarkably lofty, and the columns are correspondingly grand. In the newer portions of the tn. are flourishing manufs. of linen, cotton, silk, and wool. A. is a famous gardening centre, and the produce has a very extensive sale. Pop. 92,780. This city was the scene of the peace of A., 1802, where the claims of England, France, Spain, and Holland were settled. By it Britain acknowledged the new claims of France in Europe, and agreed to give up her late conquests excepting Ceylon, captured from Holland in 1796, and Trinidad, which she took from Spain in 1797, and to restore Malta to the Knights of St. John. The Mise of A. was concluded in 1264, Louis IX. of France acting as arbiter between Henry III. of England and Simon de Montfort. Louis IX. took the side of Henry, and the Provisions of Oxford were declared null and void. This famous city was often threatened, but never taken by the Germans in the Great War. In the second Battle of the Somme (1918) it was clearly the main object of the enemy to reach the city, an inference which was drawn from the fact that the weight of its attack fell upon the ill-fated British Fifth Army. On the sixth day of the battle (March 26) the danger of the Germans reaching the city and driving a wedge between the British and Fr. armies was very present, for Gen. Haig had ordered his last reserves to the threatened point and it was doubtful whether Pétain could send up Fr. reinforcements in time. Fortunately the Germans could not sustain the momentum of their attack and were exhausted by the protracted and stubborn resistance of the Allied Armies, which, as a result of the Doullens Conference, were, at the height of the crisis, put under the supreme command of Foch. On April 24 the Germans made a last attempt to break through to A., and for a short time were actually in possession of Villers-Bretonneux only 9 m. to the E. But the British 4th Army, under Gen. Rawlinson, who had been put in command on the A. front on March 28, brilliantly counter-attacked on April 24, recaptured Villers-Bretonneux, and so closed the gate to A. In the following August, after Foch had assumed the offensive, Haig attacked the enemy on the A. front (Aug. 8). In the Battle of A. he attacked with the 3rd British Corps, the 33rd American Div., and the Australian and Canadian Corps of Rawlinson's Army, the W. front of the 11 m. wide salient made by the Germans the previous March, while Gen. Debeney, acting under Haig's orders, attacked some 4 m. southward of the salient. On that day (Aug. 8) 2000 guns were gathered on the Fourth Army's front of attack and they opened the bombardment almost simultaneously. Under cover of a favouring mist, the tanks, followed by the assaulting troops, burst through the Ger. lines in one irresistible torrent. Over 200 tanks, the development of which had by then been greatly improved

since the battles of 1916, were used in the first line, and as many more were in support. Demoralisation spread in the Ger. ranks, and by Aug. 10 the Dominion troops, aided by the Cavalry Corps, had pierced the Ger. lines to a depth of 12 m. It is worthy of note that Ludendorff himself says that 'Aug. 8 was the black day in the history of the Ger. Army.' (Consult Major-Gen. Sir F. Maurice's *The Last Four Months*, 1919.)

Amigoni, Jacopo (1675–1752), a painter, was *b.* in Venice and *d.* at Madrid. He worked successively in Flanders, England, and Germany; and was called to Madrid, 1747, where he received the title of 'court painter.' His works consist of portraits in oil and frescoes, and are to be seen in the museums of Madrid, Seville, and Leipzig.

Amilcar, *see* HAMILCAR.

Amines, organic substances formed by the replacing of one or more of the hydrogen atoms of ammonia by an equivalent number of univalent organic radicals, such as alkyl groups (*q.v.*) or those derived from benzene, *e.g.* phenyl, C_6H_5 groups. They are divided into primary, secondary, and tertiary A. according to the number of hydrogen atoms displaced by radicals. Primary A. are methylamine, $NH_2·CH_3$, ethylamine, $NH_2C_2H_5$, etc.; secondary A. are dimethylamine $NH(CH_3)_2$, diethylamine, $NH(C_2H_5)_2$, etc.; and tertiary A. are trimethylamine, $N(CH_3)_3$, triethylamine, $N(C_2H_5)_3$, etc. Among the aromatic amines, aniline or phenylamine, $C_6H_5·NH_2$, is the most important.

Aliphatic A. are formed when an alcoholic or aqueous solution of ammonia is heated with an alkyl halide, the alkyl group taking the place of one atom of hydrogen in the ammonia. When excess of ammonia is employed all three A. are formed, but it is often possible by adjusting the proportion of ammonia and the time of the action to obtain a given A. as the main product, whence usually by ractional distillation the smaller uantities of the others can be iminated. The three A. may be stinguished by their behaviour wards nitrous acid, primary A. elding alcohols with evolution of trogen, secondary A. yielding yelvish liquids called nitrosoamines, ilst tertiary A. are unacted upon oxidised. Aromatic amines are pared by the reduction of nitronpounds; thus nitrobenzene, $I_5·NO_2$, yields aniline on reduction h tin and hydrochloric acid. he lower aliphatic A. are inflamble gases, very soluble in water; and the higher members are liqu with low boiling points, and a miscible with water. All have curious odour of boiled lobste Methylamine occurs in 'perennia mercury,' and dimethylamine an trimethylamine are constituents o herring-brine. Many of the ver poisonous ptomaines (*e.g.*, *putrescin* and *cadaverine*) are amines. Aniline (*q.v.*), toluidine, and benzidine are among the chief aromatic amines.

Amiot, Le Père Joseph (1718–94), a learned Fr. Jesuit, was *b.* at Toulon and *d.* at Pekin. He was sent as a missionary to China, and arrived at Macao, 1750, and at Pekin, 1751, where he lived until his death. His knowledge of Chinese and Tartar languages allowed him to interpret many obscure passages in the Chinese writers, and his works contain valuable information on China and Chinese literature, arts, and history. Among them are: *Art Militaire des Chinois*, 1772; *Vie de Confucius*; and *Dictionnaire Tartare-Mantchou-Français*.

Amir (also 'Ameer' and 'Emir'), an Arabic word meaning 'commander,' assumed as a title by various Mohammedan rulers in Asia and N. Africa. Until 1926 the best known was the Amir of Afghanistan, but in that year the Amir, Amanullah Khan, adopted the title of 'King.'

Amirante Islands, *i.e.* Admiral Is., named after Vasco da Gama, their discoverer, a group in the Indian Ocean, S.W. of Seychelles, in lat. 5° S., long. 53° E. They are owned by Great Britain as a dependency of Mauritius. The scanty pop. supports itself by fishing.

Amisia, the Rom. name of the Prussian tn. of Ems; also of the riv. of the same name.

Amjhera, a tn. Central India, situated in the opium-growing dist. of Malwa; pop. 97,000.

Amlwch, seaport of Anglesey, N. Wales, 15 m. N. of Beaumaris; pop. 2720.

Amman, Johann (1669–1730), Swiss physician, *b.* at Schaffhausen, and graduated at Basel in 1687. Began to practise at Amsterdam. An early authority on the teaching of the deaf and dumb, his method being to attract the attention of his pupils to the motions of the lips and larynx, and then to urge them to imitate these movements. His great work, *Surdus Loquens*, was pub. in 1692. He *d.* at Warmound, near Leyden. 2. Ger. botanist and physician (1707–42). *b.* at Schaffhausen; graduated at Leyden, 1729; became professor of botany at St. Petersburg in 1733, and *d.* there, leaving an unfinished work on Russian plants.

Amman, Jost (1539–91), Swiss painter and engraver. His productions are extremely numerous, but he is most remarkable for his engravings on wood. His works are chiefly to be found at the Berlin Museum.

Ammanati, Bartolomeo (1511–92), It. architect and sculptor. He studied under Sansovino, and did much work for Pope Julius III.

Ammelide, a substance obtained from ammeline. It is a white powder, insoluble in water, alcohol, and ether, but soluble by the alkalis and strong acids. Its formula is $C_{12}H_9N_9O_6$.

Ammeline, a substance obtained by the action of hydrochloric acid on melam. It is of a splendid white colour, and is composed of very fine silky needles; it is insoluble in water, alcohol, and ether, but soluble in the caustic alkalis. When fused with hydrate of potash, A. is converted into ammonia and cyanate of potash. Its formula is $C_6H_5N_5O_2$.

Ammeter, or ampere-meter, an instrument for measuring the strength of an electric current in amperes (*q.v.*). In the best direct-current (D.C.) As., the current passes round a light coil pivoted so that it can rotate in a narrow gap between a soft-iron cylinder and the concentric poles of a horseshoe magnet. The current causes the coil to behave as though its faces were magnetised, and the coil therefore rotates to face the poles of the magnet, but its motion is resisted by delicate hair springs attached to it. The pointer of the instrument is carried by the coil, and the angle through which it rotates is directly proportional to the strength of the current. This proportionality is only achieved by the presence of the iron cylinder which makes the magnetic field radial in direction, so that the pull on the coil is the same in all positions as it rotates.

In alternating-current (A.C.) As., the attraction of the moving coil is provided by the current flowing round a fixed coil. In this way the alternations of the current do not affect the direction of the attraction. Cheap As. of the moving-iron type depend on the attraction of a piece of soft iron towards the centre of a fixed coil round which the current flows, but for these and other As. such as thermal As., which depend on the heating effect of a current and are equally suited to A.C. or D.C. measurements, see *Industrial Electrical Measuring Instruments*, by K. Edgcumbe, 1908.

Ammianus, Marcellinus, the last Lat. historian of the Rom. empire, lived some time in the fourth century A.D. He served in his youth in the E. and under Constantius II. in Gaul, and later accompanied Julian in his expedition against the Persians. In his later years he wrote, in thirty-one books, a history of the empire from the accession of Nerva to the death of Valens (96–378). Of this work (*Rerum Gestarum Libri XXXI.*) only eighteen books remain, covering from 353–78. A. was a Gk., and his work is characterised by impartiality and insight. Ed. Gardthausen, Leipzig, 1875; Eng. trans. Yonge, Bohn's Classical Library.

Ammir, a kind of canoe at one time in frequent use in the Highlands of Scotland.

Ammirato, Scipione (1531–1601), historian, came of a well-known family of Lecce, in the kingdom of Naples. On the advice of Braccio Martelli, Archbishop of Lecce, he entered the church, but on his patron's falling into disfavour with the pope his prospects of advancement were seriously diminished, and he settled down to a life of pleasure and study in Venice. An amorous intrigue compelled him to leave the city, after which he travelled from place to place, finally securing the favour of the Medicis in Florence. Here he received a commission to write the history of Florence. This work, entitled *Istorie Fiorentine*, appeared in two parts, the first in 1600, the second after his death, in 1641. Amongst his other works are: *Delle Famiglie Nobili Napolitane*, 1580; *Delle Famiglie Nobili Fiorentine*, 1615; *Discorsi Sopra Cornelio Tacito*, 1591.

Ammodytes (Gk., sand-dweller), a genus of carnivorous fish of the family Ammodytidæ, or sand-eels, and sub-division Malacopterygii of the order Teleostei. It is related to the mullets. The body is long, the head lanceolate, the dorsal fin extends nearly the length of the back. It swims in large companies, and buries itself in the sand. *A. lanceolatus* has a protractile mouth; *A. tobianus* is smaller, and its mouth is not protractile. The fish are used for human consumption and for bait.

Ammon, later Ammon-Ra, *i.e.* Ammon the Sun, an Egyptian deity whose prin. city was Thebes. In the Libyan desert there was also an oracle known by his name. He is sometimes represented with the head of a ram, sometimes in human form wearing on his head a disc from which rise two tall feathers. His name is more correctly spelt Amūn.

Ammon, Christoph Friedrich von (1766–1850), Ger. Protestant theologian, was *b.* at Bayreuth, Bavaria. He was appointed professor of theology at Erlangen in 1789 at Göttingen

in 1794, and again at Erlangen in 1804, also court preacher to the King of Saxony in 1813. He wrote sev. books, his chief being *Fortbildung des Christenthums zur Weltreligion*, 1833–40, and his doctrine was rationalism.

Ammon, Otto, Ger. anthropologist, was *b.* in 1842 at Karlsruhe, where he was educated. He is best known by his classification of country settlers in towns into the two groups of 'round-headed' and 'long-headed,' the former attaching themselves to the commercial and industrial classes, the latter exhibiting a tendency to join the official and professional classes. This classification is known as 'Ammon's Law.' He is the author of *Die natürliche Auslese beim Menschen*, 1893; *Die Gesellschafts Ordnung und ihre natürlichen Grundlagen*, 1896; and *Zur Anthropologie der Badener*, 1899.

Ammonia, NH_3, a pungent-smelling gas; the name is also applied to the aqueous solution (spirits of hartshorn) and loosely to many of its compounds. It was known to the ancients as being produced by burning feathers and other organic substances, and the name owes its origin to the practice of distilling camel's dung in Libya near the temple of Jupiter Ammon. All animal and vegetable products containing nitrogen give off A. when heated with the exclusion of air, especially if lime or any other alkali be added. In the distillation of coal, A. is produced and dissolved in the water through which the coal-gas passes. The liquid is then distilled with lime, setting free the A., which is passed into hydrochloric acid to form ammonium chloride, the 'sal ammoniac' of commerce. A. is also produced by the agency of bacteria from decaying animal or vegetable matter. It thus finds its way into surface water and into the atmosphere, where traces are usually found. A. is manufactured according to the Haber process by heating a compressed ixture of nitrogen and hydrogen n the presence of certain finely ivided metals such as iron and olybdenum.

A. is usually prepared by heating gether a mixture of two parts of ne and one part of ammonium loride; if needed in a gaseous form, as to be collected over mercury or upward displacement, owing to its at solubility in water. A. can be efied at 0° C. by the application of ressure of seven atmospheres, and heat it absorbs in returning to a ous form causes a fall in temperain surrounding objects which has to its use for refrigerating purs. In medicine A. is used as an antacid and as a heart stimulant cases of fainting, hysteria, etc., thou if breathed in large quantities becomes injurious.

A. was at one time supposed to the oxide of a metal to which t name of ammonium was given, b all efforts at producing it in a fr state failed. In 1808 Seebeck di covered that if mercury is brough into a strong A. solution and an electri current passed through it, a spong mass is formed, which was looke upon as an amalgam of mercury and ammonium. The amalgam rapidly decomposes into mercury, A., and hydrogen, thus pointing to the temporary formation of a substance NH_4 which has an action analogous to that of sodium or potassium in like circumstances. The salts of this radical are similar in general character to those of the alkalis. The following are the chief:

Ammonium fluoride, NH_4F, obtained by saturating hydrofluoric acid with A. It decomposes silicates and therefore is used in mineral analysis and for etching on glass.

Ammonium chloride, NH_4Cl, or sal ammoniac, is prepared on a large scale from the ammoniacal liquor of the gas-works. It is used medicinally in bronchitis, rheumatism, and liver disease; in dyeing and in the processes of tinning and soldering; and in the manufacture of Leclanché and dry electric batteries.

Ammonium sulphate, $(NH_4)_2SO_4$, found in volcanic dists., but prepared in large quantities from gas liquor. It is used for the manuf. of other ammonium salts, but chiefly as a nitrogenous manure.

Ammonium nitrate, NH_4NO_3, prepared by neutralising A. with nitric acid. It explodes when rapidly heated and is used as a constituen of various explosives (*e.g. ammona* a mixture of A. nitrate with powdere aluminium), and for the manuf. o nitrous oxide. It is also used in small-scale manuf. of ice-cream, since a low temperature is produced when it is dissolved in water.

Ammonium carbonate is known as 'rock-ammonia,' and is used in smelling-salts and for cleansing purposes.

Ammoniac, Gum, a gum-resin used medicinally as an expectorant or plaster. It is obtained from the umbelliferous plant *Dorema ammoniacum* in the form of a milky juice. Its smell is nauseous.

Ammonite (from *ammonia*), a nitrogen compound used for blasting.

Ammonites, a Semitic race descended, according to Gen. xix. 38, from Lot, their progenitor being Ben Ammi; they were closely related

universal of a copper driving-band fitted into a groove round the body of the projectile. During the Great War many new types of A. were introduced to meet the varying methods of warfare. Among these the following are the more important: *Smoke shells*: these contained a smoky mixture which on bursting, created dense clouds of smoke. Its tactical use was for screening movement, and for ranging guns where the observation of fall of shot was otherwise difficult. *Star shells*, containing parachute lights and made to open in the air by a small charge, were used to illuminate areas in the enemy's position. *Gas shells*: These were first introduced by the Germans. They contained poisonous gases which were released by the bursting of the shell. *Mortar bombs* were introduced for trench warfare. They were fired from trench mortars of varying sizes and were charged with gas or high explosive. Their simplicity of design and lightness in transport made them very suitable for use in trenches. *Aerial bombs*: cylindrical and torpedo-shaped, designed for dropping from aircraft by release from carriers in the machine. The chief types used were those filled with high explosives for damaging buildings, earthworks, railways, and A. dumps, and those with incendiary mixture for setting fire to buildings, etc. *Anti-aircraft shell*: these are filled with high explosives for attacking hostile aircraft, and are arranged to burst in the air by means of a time burning fuse.

Amnesia (Gk., lack of memory), partial or complete loss of memory. Complete A. is practically impossible, as without some memory no intellectual action could continue. The commonest form is that of verbal A., when the names of objects are forgotten. When the patient can partially articulate, the condition is known as amnesic asphasia. A. may be caused by old age, brain-diseases, various forms of insanity, or even by excessive fatigue or weakness. The condition may be permanent, but is enerally temporary. A. due to ysteria or hypnotism may be called eriodic.

Amnesty (Gk. ἀμνηστία, oblivion), act of state granted by a gov. by hich pardon (or oblivion) of certain st offences is accorded. It is generly given in the case of whole secns of the community, who have n guilty of some offence against state, and it completely obliters the offence, whether granted re or after conviction. As., ted either by the sovereign or by of parliament, are sometimes general, but more often have cor exceptions made; *e.g.* the murde of his father were excepted from A. granted on the accession of Cha II. As. were frequently granted criminals at coronations.

Amnion (Gk. ἀμνός, a lam is the innermost membrane whi invests the fœtus of mamma birds, and reptiles. As time procee it thickens and separates from i close adhesion to the embryo; b tween it and its contents there tho flows the *liquor amnii* which preserv the embryo from harm and keeps i at an equal temp. Its softness is responsible for its name.

Amœba (Gk. ἀμοιβή, change), a genus of Protozoa, the lowest class of animal life, and type of the order Amœboidea. It consists of naked protoplasm containing a single nucleus, and the cytoplasm is granular. It contains a *contractile vacuole*, or pulsating space, and possesses the power of throwing out *pseudopodia*, processes which are continuously being drawn back while others are protruded. It is by this succession of pseudopodia formation that the organism is capable of motion in the water. The food is absorbed into any part of the body by intussusception, and is also excreted by any part of the body. There is no sexual reproduction, the A. merely splits in two when it reaches maturity. The resulting organism is transparent and colourless, or faintly yellow, and may be found in fresh water; frequently it is extremely minute. *See* J. Leidy's *Fresh-water Rhizopods of N. America*, 1879; E. Haeckel's *Die Radiolarien*, 1862.

Amœbæan Verses (Gk. ἀμοιβαῖος, interchanging), a species of verse in which two persons answer alternately. Such are some of Vergil's *Eclogues*.

Amol, Persian city, prov. of Mazanderan, on riv. Heraz; pop. 10,000.

Amomum (Lat. and Gk. *amomon*), a genus of plants belonging to the Zingiberaceæ, found in tropical regions. The fruit of many are cardamoms, while that of *A. Melegueta* is grains of Paradise.

Amontillado, a popular variety of light Sp. sherry.

Amontons, Guillaume (1663–1705), a diligent mechanician and experimenter in natural philosophy, was *b.* at Paris. He improved the instruments and devised others for measuring the density, temp., and humidity of the atmosphere; he was the first to make experiments in a species of telegraph.

Amoor, *see* Amur.

Amorites ('mountaineers,' or possibly 'people of high stature') an anct. race of Canaan, occupying the

land on both sides of the Jordan. The name is sometimes used in the O.T. as synonymous with Canaanites, sometimes as that of a special tribe. Sihon and Og, the kings of the A. on the E. of Jordan, were defeated by Moses, and later those dwelling on the W. were defeated by Joshua in two battles, and their land was divided among the tribes.

Amoroso (It., loving or tender), in music, indicates a tender, slow manner.

Amorpha is a genus of Leguminosæ found in N. America. It has small flowers, and all the petals are suppressed except the vexillum. *A. fruticosa* is cultivated in Britain.

Amorphophallus is a genus of Araceæ found in the E. Indies. The rhizome produces a single enormous leaf annually, and an enormous spadix, bearing both male and female flowers. In the species *A. Titanum* the spadix is sometimes 3 ft. high.

Amorphous (Gk. ἀ, without, μορφή, shape), a term used in biology to denote that a body is formless or irregular in shape. In chemistry amorphism is the state of a substance in which it presents no crystallised form.

Amortisation: 1. A *law* term, signifying alienation in mortmain, that is, the alienation of lands or tenements to a corporation, which was considered formerly as transferring them to *dead hands*, as such alienations were usually made to religious houses for superstitious uses. 2. In finance, the provision of a fund out of income for extinction of debt, redemption of bonds or shares, or replacement of cap. expenditure.

Amory, Thomas (c. 1691–1788), an Irish author of eccentric habits who in 1757 was living at Westminster. His books are a medley of autobiography, fiction, scenic descriptions, sentimental rhapsodies, and deist theology. He pub. *Memoirs, containing the Lives of several Ladies of Great Britain; a History of Antiquities, etc.*, 1755; and *Life of John Buncle, Esq.* (his best book), 1756 and 1766.

Amos, the earliest of the twelve minor prophets. He was a native of Tekoa, near Bethlehem, and followed the occupations of a shepherd and a tender of sycamore trees. He prophesied in the eighth century B.C. when Uzziah reigned in Judah and Jeroboam II. in Israel. He prophesied the death of Jeroboam and the captivity of Israel on account of the national sins, chief of which is disloyalty to Yahweh, the nation practising in his name rites abhorrent to him. The style of the prophet is clear and vigorous, abounding in picturesque images drawn from pastoral [illegible] life. [illegible] was probably [illegible] the people [illegible] with Yahweh [illegible] joy, [illegible] prophecies were [illegible] as well as spoken. The book [illegible] contains many [illegible] which are textual. [illegible] certainly been made [illegible] work, the most [illegible] passage [illegible] authorship. See [illegible] and G. A. Smith [illegible].

Amoy [illegible], a Chinese [illegible] in lat. 24° 28′ N. [illegible] in the prov. of [illegible] of the [illegible] possessing [illegible] exceedingly [illegible] the chief centre [illegible] tea, but this [illegible]. A great many [illegible] from Amoy [illegible] after making their [illegible] and live there. [illegible] foreign settlement [illegible] is opposite [illegible] was founded [illegible] also exports porcelain [illegible] importing raw cotton [illegible] manufactured goods, etc. [illegible] the five ports opened [illegible] commerce by the treaty [illegible] in 1842, having been [illegible] British in 1841. Pop. [illegible]

Ampelidaceæ, [illegible] dicotyledonous [illegible] with Vitaceæ [illegible]

Ampelopsis, [illegible] genus of Vitaceæ (or Ampelidaceæ, included in *Vitis* (q.v.), [illegible] climbing by means [illegible] of the [illegible] *hederacea* [illegible] Virginian creepers.

Ampere [illegible], the unit of intensity [illegible] in terms of other units [illegible] defined as the intensity [illegible] which is produced in [illegible] whose total resistance [illegible] when there is kept up [illegible] a potential [illegible] amounts [illegible]. The A. is legally defined as the continuous unidirectional current which, when flowing through a neutral solution of silver nitrate, *deposits on the negative pole* ·001118 *of a gramme of silver in one second. An alternating current* is said to have an *intensity of one A.* if it produces in a fine wire the same heat in the same time as a continuous current of one A. as determined by silver deposition.

Ampère, André Marie [illegible], famous Fr. physicist [illegible] mathematician [illegible]

pere, unit of strength of an electrical current, took its name. He was *b.* at Lyons, and in 1793 his father was guillotined by the revolutionists. This event threw him into a state of deep melancholy, to alleviate which he redoubled his studies. As professor of mathematics and physics at Bourg, he pub. his *Considérations sur la théorie mathématique du jeu.* His great work was in the field of electrodynamics (electromagnetism). Record of his discoveries may be found in the *Ann. Chim. Phys.* from 1820 onwards.

Ampère, Jean Jacques Antoine (1800–64), *b.* at Lyons, was the only son of André Marie Ampère, and professor of the history of Fr. literature at the Collège de France. He was an extensive traveller, visiting Scandinavia, Italy, Africa, Greece, etc., and his travels are reflected and described in his works. In 1847 he became a member of the Academy. He was a distinguished philologist, cognisant with the languages of most of the countries he visited. In 1839 and 1841 he pub. histories of various periods of Fr. literature. In 1848 his *Grèce, Rome, et Dante* gave an impetus to the study of the great Italian in France. His chief work, on which he was engaged at his death, is his *Histoire romaine à Rome.*

Ampersand (corruption of 'and *per se*), the typographical character & or *&*.

Ampheristus, a fossil fish from the Isle of Sheppey.

Amphiaraus, in Gk. legend a famous soothsayer and hero of Argos, the son of Œcleus and Hypermnestra, and a member of the Argonautic expedition. His wife, Eriphyle, bribed by Polynices with the necklace of Harmonia, induced him to take part in the first expedition of Seven against Thebes, where, after fighting bravely, he took to flight and was swallowed up by the ground. He was made one of the immortals, and the temple built in his memory long harboured a famous oracle.

Amphibia (Gk. ἀμφί, on both sides, βίος, life), a class of vertebrates of which many are able to live on land or a considerable period—hence the ame. The living species include alamanders, frogs, toads, and newts. he class is divided into four orders, e *Gymnophiona*, which are sightless, mbless, and snake-like; the *Urodela*, nich possess tails and usually four nbs, and are scaleless, *e.g.* salamanrs and newts; the *Anura* (or *trachia*), which are tail-less and leless, but have external gills and r limbs, *e.g.* frogs and toads; the *gocephali*, an extinct order, lizard-and bony, usually with long tails. ll A. have gills, though these are often replaced by lungs in the ad their hearts possess two auricles, ventricle, and a conus arterios when they have limbs the legs pentadactyle; the skin is soft a scaleless except in the Gymnophio The eggs are usually laid in wate in the case of the axolotl (*see* AMBL STOMA) breeding takes place in t larval stage. The eggs often develo into tadpoles, but some A. are viv parous and bring to life perfec animals. They are carnivorous whe adult, and hibernate. In organic lif they rank between reptiles and fishes Many live in tropical countries, but frogs and toads are universally distributed. *See* H. Gadow's *Amphibia and Reptiles* in the Cambridge Nat. History, 1901; G. A. Boulenger's *Catalogue of the Batrachia in the British Museum*, 1882.

Amphibole (Gk. ἀμφίβολος, ambiguous), a group of minerals which enter into the composition of a large number of rocks. They are essentially silicates of calcium and magnesium, but also include oxides of iron and of manganese. They crystallise in oblique prisms, and some are used as gems. The chief varieties are tremolite, actinolite, and hornblende.

Amphibolite (Gk. ἀμφίβολος, ambiguous, λίθος, stone), a name sometimes given to hornblende.

Amphibrach (Gk., short on both sides), in prosody a foot of three syllables, the first and last short, the middle long, as in Lat. *ălīsmă* and English *ĭnhūmăn*.

Amphictyonic Council. An amphictyony was a confederation of neighbouring tribes, or those having interests in common, for purposes of mutual protection and the guarding of some shrine. The participants in such a league were called 'amphictyons,' or 'dwellers around.' There were sev. A. Cs. in anct. Greece, as those of Argos and Delos, but the chief was that of Delphi. Its origin was certainly very early, being connected traditionally with Amphictyon, son of Deucalion, and, though much of its authority was lost in the third century B.C., it still existed with limited power under Rom. rule, and is last mentioned in the second century A.D. The names of the tribes concerned differ in various accounts. The list given by Æschines includes the Thessalians, Bœotians, Dorians, Ionians, Perrhæbians, Magnetes, Locrians, Œtæans, Phthiots, Malians, and Phocians. It is known that there were twelve tribes, so to this list either the Dolopians or the Ænianians should be added. Each tribe sent two deputies of equal authority, who met twice each year, alternately at Delphi and

Thermopylæ. Though the functions of the council were mainly religious, concerned with the sanctuary of Pythian Apollo, judicial rights and the regulation of peace and war came within its scope. *See* Bury's *Hist. of Greece*, passim.

Amphidesma (Gk. ἀμφί, on both sides, δεσμός, bond), or *Semele*, a genus of molluscs of the order Teleodesmacea and family Semelidæ. Lamarck gave it the above name because he observed that it had a ligament and a cartilage. There are about 100 species to be found in the Tertiary and Recent systems.

Amphidetus, a genus of Echinidæ found in the crag of Suffolk.

Amphigene, *see* LEUCITE.

Amphilestes, a mammal of the Jurassic epoch, of which very few remains have been found, and the anatomical structure of which is practically unknown.

Amphimacer (Gk., long on both sides), in prosody a foot of three syllables, the first and last long, the middle short, as in Lat. *cāstĭtās*. *A.* is the opposite of *amphibrach*.

Amphion, in Gk. mythology, a skilful musician. Son of Zeus by Antiope, who, driven out of Sicyon by her husband, Lycus of Thebes, and Dirce his wife, fled to Mt. Cithæron, where A. and his twin brother Zethus were born. They were exposed there, but found and reared by a shepherd. On reaching manhood they revenged their mother's wrongs on Dirce by causing her to be dragged to death by a bull. They then took possession of Thebes, and during the building of its fortifications the stones moved to the sound of A.'s lyre. He married Niobe, and was killed by Apollo.

Amphioxus (Gk. ἀμφί, on both sides, ὀξύς, pointed), a small fish-like animal, representing the simplest of all vertebrates, the *phylum*, is found in all seas. Its organs are all primitive when not absent; visual and olfactory organs are not absolutely known to exist, the notochord is never replaced by a vertebral column, and there are no limbs. It contains, however, a mouth and an anus and many gill-slits. It reaches a length of nearly 2 ins., is generally found burrowed in sand, but can swim freely. About ten species are known, and *A. lanceolatus* is common to European seas. *See* A. Willey's *Amphioxus and the Ancestry of the Vertebrates*, 1894.

Amphipoda (Gk. ἀμφί, on both sides, πούς, foot), an order of Crustacea characterised by their laterally-compressed bodies, sessile eyes, three pairs of swimming and three of jumping feet. They are both marine and fresh-water animals. Species of the sub-family Orchestiina are known as the beach-flea and sand-hopper.

Amphipolis, anct. city of Macedonia, on R. Strymon, 3 m. from Ægean Sea. Originally a Thracian tn., inhabited by Edonians, it was taken by Athens about 436 B.C. In 424 B.C. it passed to Sparta, later to Macedon, and finally to Rome.

Amphiprostyle, an architectural term compounded of three Gk. words. It is an edifice of the form of an anct. Gk. or Rom. parallelogrammic temple with a prostyle or portico on each of its ends or fronts, but with no columns on its sides.

Amphisbænidæ (Gk. ἀμφίσβαινα, a serpent that can go both forwards and backwards), a family of the Lacertilia, or lizards. These reptiles have no limbs, except in a solitary genus, and resemble snakes or worms in appearance. They are found in tropical America and Africa, where they feed on worms and ants. *Amphisbæna fuliginosa*, of Brazil and Guayana, is dusky brown and nearly 2 ft. long. The natives regard its dried and powdered body as of medical value.

Amphiscii (Gk. ἀμφί, on both sides, σκιά, shadow), a term applied by anct. astronomers to the inhab. of the torrid zone, who see their shadows sometimes on the N., sometimes on the S., according as the sun is on one side or the other of the equator.

Amphissa (modern Salona), a tn. of anct. Greece, about 80 m. N.W. of Athens, situated at the foot of Mt. Parnassus. Its inhab., the Locrides Ozoles, having tilled the ground of the temple of Delphi, the Gks. under Philip of Macedon attacked and destroyed the town. Pop. of modern Salona, 9000.

Amphitheatre, a form of building invented by the Romans for the purpose of holding gladiatorial shows and displays of wild beasts. Originally these entertainments were held in the forum or the circus, but as early as 70 B.C. a wooden A. of the recognised shape, *i.e.* having seats all round the portion reserved for the performance, existed at Pompeii. The first A. to be erected in Rome was the temporary one of Cario in 59 B.C., and Cæsar erected a permanent structure in 46 B.C. Augustus, in 30 B.C., ordered Statilius Taurus to build the first A. made partly of stone, and the Coliseum, the most famous building of the kind still remaining, was erected by Vespasian and dedicated by Titus in A.D. 80. It is elliptical in shape, measuring 616 ft. by 510 ft., and the exterior wall, 160 ft. high, consists of four stories, the lowest three being arcades in the Doric, Ionic, and Corinthian styles respectively, and

the top a row of Corinthian pilasters. Inside, the 'cavea, or portion for spectators, consists of the 'podium,' or lowest tier, reserved for guests of honour, and three rows of 'mœniani,' for the various grades of the populace. The arena measures 280 ft. by 176 ft.

Amphitrite, Gk. sea-goddess, daughter of Nereus and Doris, and wife of Poseidon.

Amphitryon, son of Alcæus, King of Tiryns, married Alcmene, who, during his absence, was visited by Zeus in the shape of her husband.

Amphiuma (Gk. ἀμφί, on both sides, πνεῦμα, breath), a genus of American Amphibia of the order Urodela and family Amphiumidæ. It is allied in most essentials to the water-newt, is eel-like, about 2 ft. long, has two or three jointless toes on each of its four limbs, minute eyes, and numerous teeth in the palate in two rows. As a tadpole it has gills; in adult life only the gill-slits remain. It lives in ponds and marshes, and buries itself in mud in the winter. *A. tridactylum*, the three-toed species, inhabits Louisiana; *A. means* is called the *Congo snake* by the inhab. of Florida, and is erroneously believed to be venomous.

Amphora, a clay vessel used in Greece and Rome for wine and oil, ... urn; usually tall ... narrow neck and ... ten ending below in a point for insertion in the ground or a stand. The Gk. A. held about nine gallons; the Rom. six.

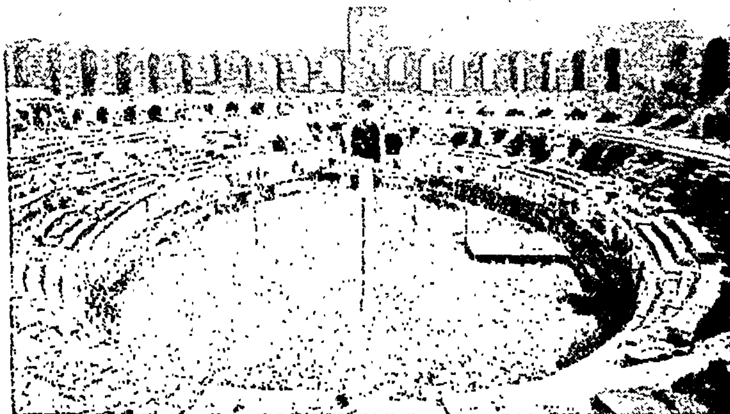
Amplepuis, a tn., Rhone dept., France, 19 m. by rail W. of Villefranche and 30 m. N.W. of Lyons. Manufs. of cotton, calico, muslin, and linen. Pop. 5693.

Amplexus (Sowerby), a fossil genus of Madrephyllicæ which occurs in the mt. limestone and Devonian limestone.

Amplitude, an astronomical term denoting the angular distance of a heavenly body, at the time of its rising or setting, from the E. or W. point of the horizon. Thus the A. of fixed stars is constant, while that of the sun is zero at the equinoxes.

Ampthill, Odo William Leopold Russell, first Baron (1829–84), was *b.* at Florence and educated privately. He entered the diplomatic service in 1849 and served as attaché at Vienna. From 1850 to 1852 he was in the Foreign Office. Subsequently he was employed in turn at the embassies in Paris, Vienna, Constantinople, and ... etary of lega- ... ritish represen- ... he performed valuable diplomatic services from 1858 to 1870. In 1870 he was appointed assistant under-secretary at the Foreign Office, and in 1871 he became ambas. at Berlin, where he attended the Berlin Congress as third plenipotentiary and rendered valuable services. He *d.* at Potsdam. He was made a privy councillor in 1872 and created a baron in 1881.

Ampthill, Arthur Oliver Villiers Russell, second Baron, son of the first baron, was *b.* in Rome in 1869, and



THE AMPHITHEATRE, ARLES

educated at Eton and Oxford, where he was president of the union. He succeeded to the title in 1884, and was assistant private secretary 1895–7, and from 1897 private secretary to Mr. Joseph Chamberlain. He was governor of Madras 1899–1906, and during 1904 temporary viceroy and governor-general of India in Lord Curzon's absence.

Ampulla (Lat. *ampulla*, bottle), a Rom. bottle with a narrow neck; in Roman Catholic Church, a cruet for the sacramental wine; also a vessel for holding the holy oil at the rites, coronations, etc.

Ampullaria (Lat. *ampulla*, bottle), a genus of fresh-water spiral univalve molluscs, inhabiting rivs. and ponds of India, Africa, and S. America, called popularly the idol-shell, or apple-snail. They can live for a considerable period without water. They are gastropods of the order Streptoneura.

Ampurdan, a dist. in Catalonia, Spain, between the R. Ter and the French frontier.

Ampurias, a tn. in the dist. of Gerona, Catalonia, Spain, situated near the Gulf of Rosas. It was founded by the Gks. of Marseille and called by them Emporeium. The Roms. called it Emporiæ, and at that time it was a flourishing city. In the time of the Goths it was an episcopal see. Pop. 2800.

Amputation, the cutting off of a limb or projecting part of the body, sometimes necessary in order to prevent the mortification or disease of that part poisoning or exhausting the whole body. There are three inventions which have made A. safer and more readily resorted to than in previous centuries. These are the tourniquet, to stop the flow of blood in the arteries; anæsthetics, to procure painlessness; and antiseptics, to prevent infection of the wound. The objects of A. are primarily to remove a dangerously diseased or injured part, and then to leave a stump which may be as useful and as free from pain as possible to the patient. To this end the methods of A. design to leave a pad or cushion of flesh at the end of the severed bone. In the 'circular' method this is attained by an assistant pulling the skin and flesh upwards as far as possible, while circular sweeps are made with the knife in a direction perpendicular to the long axis of the limb. This results in the soft parts being somewhat longer than the bone, so that they may be used as a covering. In the 'flap' method, the tissues are transfixed by the knife near the bone, and a cut is made downwards and outwards to the surface of the skin. The operation is repeated on the other side of the bone, the blood-vessels are secured, and the bone is sawn through. This leaves two semicircular flaps which are afterwards sewn together.

Amraoti, cap. city of dist. of same name in E. Berar, Haiderabad, India, 28 m. S.E. of Ellichpur. An important cotton-mart, with large textile manufs.; the headquarters of the commissioner of the prov.; and terminus of a state branch railway. Pop. 34,000.

Amravati, ruined city in Guntur dist of Madras, India, on R. Kistna. Formerly one of the chief centres of the Buddhist kingdom of Vengi and later of the Sivaite faith. Identified with the 'To-no-kie-tse-hia' of Hsuan Tsang, and the Arab 'Rahmi.'

Amrilcais, or Amru-al-Kais, Arabian poet of the sixth century, was the son of the chief of the Kinda tribe, and lived a wandering life among the Arab vagabonds and brigands until the death of his father, who was killed by the Benu-Asad tribe. He is then supposed to have bent his efforts on securing vengeance, and to have obtained troops from the Emperor Justinian. According to tradition, he was shortly afterwards killed by a poisoned cloak presented to him by the emperor, who had been told by some informer that A. had been guilty of seduction. He is the author of one of the seven *Moallaka*, in which he displays great imaginative powers. He is regarded as one of the founders of Arabian poetry. His poems have been published in Ahlwardt's *The Divans of the Six Ancient Arabic Poets*, 1870.

Amrili, or Umrili, walled tn., Gujarat, India, on Kathiawar Peninsula, 130 m. S.W. of Ahmedabad. Pop. 15,000.

Amritzar, cap. city of dist. (1574 sq. m.) and div. (5354 sq. m.) in Punjaub, India, 33 m. E. of Lahore. An important commercial and manufacturing centre, with large textile industries. It is the religious centre of the Sikhs, who have there a large temple (built in 1851 by Ram Das on an island in a tank) attended by 6000 priests. The Govindgarh, a large fortress enclosed by a deep ditch 2 m. in length, was erected in 1809 by Runjeet Singh. Semi-revolutionary disturbances broke out in the Punjaub and in other provs. in 1919. A., where Brigadier-General Dyer was in command of troops, was the scene of the gravest of these disturbances. A crowd of 15,000 natives had assembled in defiance of public proclamation in a space known as Jallianwala Bagh (April 13). They were unarmed, but General Dyer, who considered the situation critical and wanted to create an impression in

the Punjaub generally, ordered his troops to fire with ball cartridge. This they did for several minutes, and about 400 of the rioters were killed and thrice that number wounded. There followed an uproar in the political world and the British Government thereupon appointed a Committee under Lord Hunter to investigate the affair. This Committee condemned Dyer's action as being unduly severe, and the House of Commons adopted their report. Dyer, however, had previously been deprived of his command. The impression created in India was necessarily unfavourable, but among the British communities in India and a large section of the people at home the opinion was freely expressed that Dyer had saved India. Pop. 160,218.

Amru-Ibn-Al-Aas (*d.* A.D. 663), a famous Arabian warrior, who after bitter opposition to Mohammed ultimately became one of the prophet's chosen supporters. From Mohammed's successor, Abubekr, he obtained a command in the army in Syria. He fought at the battle of Aiznadin and distinguished himself in the sieges of Damascus and Jerusalem. In the years 638–40 he conquered Egypt, the campaign terminating in the capture of Alexandria, when he is said to have been responsible for the destruction of the Alexandrian Library. This charge, however, has never been proved. In his subsequent administration of Egypt he exhibited great ability, interesting himself in various public works, amongst which is said to have been the construction of a canal joining the Red Sea and the Mediterranean.

Amrum, or **Amrom,** one of the N. Friesian Is. in the North Sea. Its length is about 6 m. and its pop. 700.

Amsler, Samuel (1791–1849), Ger. engraver, *b.* at Schiznach, Switzerland, studied at Zurich, Munich, and Rome. Became professor of line-engraving at Munich, 1829. Best works, 'Triumphal March of Alexander the Great' (Thorwalden), 'Triumph of Religion in the Arts' (Overbech), and reproductions of Raphael.

Amsteg, a Swiss tourist resort in the canton of Uri, 7½ m. S.E. of Altdorf, on the St. Gothard railway.

Amstelodamum, Lat. name for Amsterdam.

Amsterdam: 1. (The dam of the Amstel). The chief commercial city of Holland, is situated at the mouth of the Amstel R., in the S.W. corner of the Zuider Zee. It is connected with the North Sea by the North Sea Canal, 15 m. long, to the construction of which (1876) it owes much of its present prosperity.

Though the importance of its shipping is secondary to that of Rotterdam, it is the headquarters of the ship-owning interest and of the trade with the Dutch E. Indies. Its principal imports are coal, grain, petroleum, tobacco, tea, coffee, cocoa, sugar, timber, and oil seeds, while it has considerable exports of dairy produce, paper, and hides. Amongst the chief industries are to be mentioned diamond cutting and polishing, for which the city has long been famous, sugar-refining, glass-blowing, iron, soap, dye, chemical, and candle manufs., shipbuilding, brewing, distilling, and tanning. A. is remarkable for the number of its docks and quays, and for its canals, by which it is intersected in all directions. In this last respect it has been likened to Venice. There are many notable buildings and institutions, among which must be mentioned the Royal Palace (*Het Paleis*), completed in 1665, and used formerly as a town-hall; the Nieuwe Kerk (New Church), a splendid Gothic building dating from 1408 and notable for its stained-glass windows and monuments; the Oude Kerk (Old Church), dating from the beginning of the fourteenth century; the St. Antonieswaag, originally a towngate and now the storehouse of the city archives; the Trippenhuis (1662); and of more modern date, the Netherlands Bank, the huge iron and glass structure known as the Paleis van Volksvlijt (the Dutch 'people's palace'), and the Rijks Museum. This last contains the wonderfully fine national collection of pictures. There are also botanical and zoological gardens, the latter being one of the finest collections in Europe. A. has two universities, the Free University, and the old State University, and many other educational and charitable institutions. It is said that the Ghetto of A. has more parents and children to the square foot than any residential region in Europe. A large number of the Jews are diamond cutters and polishers. The Portuguese Synagogue, built in 1670, has a magnificent interior. Houses are built on wooden piles, and the royal palace stands on 13,659. The children of A. are allowed the run of the Bourse (one of the finest in Europe) as a playground for a week every year. The orphanages and almshouses are very numerous. The inhabitants of this prosperous city are ceaselessly industrious. It is a city of merchants, bankers, traders, and shopkeepers; it is in the forefront of modern seaports, the market for the produce of the Dutch colonies—coffee, tobacco, sugar, rice, spices. The goods traffic of the

an aeroplane from the *Maud*, but without success. In 1925, having become bankrupt, he went to the U.S.A., where the American explorer, Lincoln Ellsworth, offered to finance him in a joint flight from Spitzbergen. The two explorers, however, had only traversed some 500 m. when they were compelled to abandon the enterprise. A. then made arrangements to join Nobile in his dirigible, and in May 1926 he and Nobile, together with



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llsworth and Lieut. Riiser-Larsen, arted from Spitzbergen and in three ays landed in Alaska. A.'s days of ploration finished with this feat, t in 1928, hearing of the plight of s old companion, Nobile, he set out a seaplane to attempt his rescue. this A. and his pilot lost their lives ARCTIC AND ANTARCTIC EX-RATION). he story of his two chief achieve-ts is told in his *The North-West sage*, 1908, and *The South Pole*, . He also wrote *The North- Passage* (1918–20); *The Flight ss the Polar Sea* (1926); and *Life as an Explorer* (1927).

nur, a riv. of E. Asia, formed by onfluence of the Shilka and the n, westward of the Khingan Mts. a total length of about 1700 m., ounting the head-waters, the 00 m. being in a south-easterly on and dividing the A. prov. from Manchuria, after which it flow N.E. through the Khingan Mts. into the Sea of Okhotsk at Nicolaievsk. It is navigable for its entire course. Its chief tribs. are the Sungari, the Usuri, the Zeya, and the Bureya. The most important tns. situated on it are Blagovieshtchensk, Aigun, Khabarovsk, and Mariinsk.

Amur Petroglyphs, the name given to a number of curious anct. sculptures carved on boulders at the mouth of the Orda riv., which flows into the Amur. They were discovered a few years back by the American Jesup N. Pacific Expedition.

Amurath: (1) Amurath I., Sultan of Turkey 1360–89; began Turkish conquests in Europe. (2) Amurath II., sultan 1422–51; defeated Hungarians at Varna and Kossovo. (3) Amurath III., sultan 1574–95. (4) Amurath IV. sultan 1623–40; notorious for his extreme cruelty. (5) Amurath V., sultan May-Aug. 1876.

Amurnath, a mt. cave in N.W. Cashmere, believed to be a residence of the God Siva, and hence a place of pilgrimage.

Amyclæ, an anct. tn. of Laconia, Greece, on R. Eurotas, 2½ m. S.E. of Sparta. It was the chief tn. of the Achæans, and remained independent after the Dorian conquest. The Hyacinthia was celebrated here annually. Numerous remains have been found on the site.

Amygdalin ($C_{20}H_{27}O_{11}N$), a glucoside found in bitter almonds, cherry kernels, and other vegetable products. When macerated and kept in contact with water, fermentation sets in, due to the presence of emulsin, and the substance is decomposed into hydrocyanic acid (prussic acid), benzaldehyde, and glucose.

Amygdaloid (Gk. ἀμύγδαλον, almond, εἶδος, shape), the old name of a variety of igneous rock, usually basaltic, containing cavities in which round or almond-shaped bodies are formed, consisting of agate, calcareous spar or zeolites.

Amygdalus is the name of a subgenus of *Prunus*, formerly considered as a genus, of the order Rosaceæ. It includes *A. communis*, the almond (*q.v.*), and *A.* or *P. Persica*, the peach. The leaves yield prussic acid.

Amyl, an organic radicle corresponding to the formula C_5H_{11}. There are eight A. alcohols, the most important being isobutyl carbinol, which is a constituent of fusel oil. A. nitrite is a yellow liquid with a penetrating odour; it is used in medicine for angina pectoris, etc., owing to its power of producing vascular dilation and of stimulating the heart's action.

Amyloid Disease, also known as

Lardaceous Disease, or *Waxy Degeneration*, is a disease in which there is a degeneration of the cells of certain organs by which an A., or lardaceous, substance is formed. It is a secondary disease, produced by such causes as a suppurated bone, cancer, syphilis, and pulmonary diseases, and attacks most frequently the liver, kidneys, spleen, intestines, and lymphatics. It is nearly always fatal.

Amylopsin, a diastatic ferment from the pancreatic juice, capable of converting starch into sugar.

Amyntas: 1. A., King of Macedonia (c. 540–500 B.C.). 2. A., King of Macedonia (393–369) B.C.), was the son of Philip, the brother of Perdiccas II. He sought the friendship of Athens, and left by his wife Eurydice three sons, Alexander, Perdiccas, and the famous Philip, called by Ovid 'Amyntiades.'

Amyot, Jacques (1513–93), Fr. writer and translator, *b.* at Melun. In 1540 he became professor of Gk. and Latin at Bourges, in 1558 tutor to the sons of Henry II.; in 1560 grand almoner of France; and in 1570 bishop of Auxerre, where he died. His most famous translation was that of Plutarch's *Lives*, 1559, which, besides being used by Corneille and establishing itself as a model of Fr. prose style, formed the basis of North's translation in Eng., 1575, from which Shakespeare took his Rom. plots. Other works were translations of *Theagenes and Charicea*, 1546; seven books of Diodorus Siculus, 1554; *Daphnis and Chloe*, 1559; and Plutarch's *Moral Treatises*, 1572, all of which have become Fr. classics.

Amyraut, Moise (1596–1664), a distinguished Fr. Protestant theologian and writer, after graduating in law, studied divinity under the celebrated Cameron at Saumur. He for some time held a ministerial charge, and was subsequently appointed professor of theology at Saumur. Amongst his chief writings are paraphrases of the Psalms and N.T., *De Secessione ab Ecclesia Romana*, 1647; *Irenicon*, 1662; *Traité de la Prédestination*, 1634; and *Traité des Religions*, 1631.

Amyris, a genus of tropical plants of the order Rutaceæ. They yield a fragrant resin.

Amzel, the ouzel, a blackbird; also a name for the ring ouzel.

Ana, a suffix added to the names of famous men to designate collections of their sayings and table-talk, anecdotes about them, and notes in any way bearing on their life, *e.g.* Johnsoniana, Boswelliana, Shakespeariana. The use of such titles dates from the *Scaligerana*, pub. in 1666 by the brothers Dupuy.

Anabaptist, the name given to a Christian sect which appeared in Germany at the time of the Reformation, repudiating infant baptism (hence the name, meaning 'baptised again,' which refers to their adult baptisms) and teaching equality and community of all goods. The movement was begun about 1520 in Saxony by the 'Prophets of Zwickau.' They were strongly opposed by Luther, but their leader, Thomas Munzer, travelled over Bohemia, Thuringia, and Switzerland, preaching with much success, especially at Waldshut, on the Swiss border. He joined and largely engineered the Peasants' War in S. and Central Germany, and was executed after the defeat of his party at Frankenhausen in 1525. The doctrines of the sect continued to be propagated by wandering preachers, such as Melchior Hoffmann, who in 1528 installed John Matthiesen as a bishop at Emden. He sent out many disciples, two of whom founded the new theocratic state of Munster in 1553. An era of wild licentiousness in this city followed, under the leadership of John Bockhold, crowned in 1534 as prophet and king, assisted by Rothmann, Knipperdolling, Krechting, Kippenbrock, and Matthieson. The city was besieged and taken by sev. Protestant princes in 1535, and on the execution of the leaders the movement began to die out, though still continuing in the Netherlands under David Joris (John of Bruges) and others. A new era began with Menno Simons, who estab. a community which, while rejecting infant baptism, gave up the objectionable features of the A. creed. The Mennonites, who spread all over Germany, Switzerland, and Holland, practically corresponds with the Baptist denomination in England, in which adults are re-baptised on joining the church. Menno's doctrines are expounded in his book, *Elements of the True Christian Faith*, written in Dutch. See E. B. Bax, *Rise and Fall of Anabaptists*, 1903.

Anabas is a genus of fishes of the family Anabatidæ, allied to the mullets and sword-fish. *A. scandens*, the climbing perch, resembles a perch to some degree. It has large scales, and can remain for a considerable time without water, even travelling overland in search of it. It has been stated that it is capable of climbing trees, and has been captured at a height of 5 ft. in a palm-tree.

Anabasis, the name of two Gk. historical works: (1) Xenophon's (fourth century B.C.), recounting the defeat of Cyrus the Younger by Artaxerxes

and the retreat of the 10,000 Gks. in his army under Xenophon. (2) Arrian's (A.D. 166–8), recording the campaign of Alexander the Great.

Anabathra, a fossil tree, from Allenbank, Berwickshire, is thus named by Mr. Witham and figured in *Foss. Veg.* t. viii. and t. x.

Anableps (from Gk. ἀναβλέπω, to look up), a genus of Malacopterygious osseous fishes. They are remarkable for their projecting eyes, which have two pupils. The *A. tetrophthalmus* inhabits the rivs. of Guiana and Surinam. Its anatomy has been made the subject of a memoir by Lacépède, which is pub. in the second vol. of the *Mémoires de l'Institut.*

Anabolism (Gk. ἀνά, on high, βόλος, heap), the building-up process in the protoplasm of a living organism, as opposed to *catabolism*, or the breaking-down process.

Anacardiaceæ, an order of dicotyledonous plants growing chiefly in tropical countries. They are trees or shrubs which abound in an acrid resin. The flowers are usually in parts of five, the stamens less than ten, carpels three, with a single ovule. *Anacardium occidentale*, a small genus of A., the cashew-nut, grows in the W. Indies; the nut is a kidney-shaped, edible body.

Anacharis is synonymous with *Elodea*, a genus of water-plants of the order Hydrocharitaceæ which grows in America. *A.* (or *E.*) *canadensis*, the American water-weed, was transplanted to England, and now grows rapidly in our canals by vegetative multiplication.

Anacharsis, a Scythian philosopher, said to have been a friend of Solon, and the only barbarian admitted to Athenian citizenship. Some writers place him among the Seven Wise Men of Greece. Numerous witty sayings, among which was his saying that at Athens were men who deliberated but left the decision to fools, and proverbs preserved by Diogenes Laertius, Plutarch, and Lucian, are attributed to him. He was killed by the King of Scythia for worshipping Cybele with Gk. rites. Aldus, in his collection of *Greek Epistolographers* (Venice, 1499, 4to), pub. nine letters under the name of A., which are pronounced by Bentley to be forgeries. The other works ascribed to A., such as an epic poem of eight hundred verses, a work on war, on the laws of the Scythians and some Gk. customs, are lost; but they were unquestionably more genuine than the letters.

Anacharsis the Younger, *see* BARTHÉLEMY.

Anachronism (Gk. ἀνά, back, χρόνος, time), the reference of an event, custom, or expression to a wrong date. This is common in literature and other forms of art, especially painting, and although it most often is the result of an oversight and sometimes ignorance on the author's part, it is nevertheless sometimes a deliberately adopted device made for heightening a dramatic effect, or for achieving condensation. It is not easy to decide whether an A. is deliberately intended by the author. When Shakespeare peopled anct. Athens with Elizabethan joiners, weavers, and bellows-menders he may have been 'writing down' to his audience or have been unconscious of any A., but when he makes Cassius in *Julius Cæsar* say, 'The clock hath stricken three,' the A. was probably intentional. In the sixteenth and seventeenth centuries As. abound in the works of dramatic and other writers, but it does not follow that the artistic merit of their work is thereby spoilt. When Lucifer is expelled from heaven with the aid of cannons and gunpowder, the dramatic effect of Milton's story is increased, for by the time he wrote his *Paradise Lost* men had come to think always of battle as being enshrouded in a sulphurous canopy. Where, however, an attempt is obviously made to give correct local colour and A. is intended, the artistic harmony is disturbed. For Shakespeare to make as he does in *Troilus and Cressida*, Agamemnon quote Aristotle, is almost as bad as when he places Verona on the sea-coast (the latter is an error, but not an A., for it has no reference to time). But Virgil, in making Queen Dido the contemporary of Æneas, violates no artistic canons. The Renaissance painters were frequently guilty of A., and the Flemish school even went to the length of putting spectacles on the noses of scriptural characters.

Anacoluthon (Gk. ἀν, not, ἀκόλουθος, following), a term employed both in grammar and in oratory to imply lack of logical sequence, *i.e.* in which the latter half of a sentence does not correspond in construction with the first part. This is common enough in ordinary speech, but is deliberately employed in literature to add grace or emphasis. Example: 'And he charged him to tell no man: but go, and show thyself to the priest' (Luke v. 14).

Anaconda, a S. American water snake, allied to the boa-constrictor, which lives on the banks of rivers in Brazil and Guiana.

Anaconda, the co. seat of Deer Lodge co., Montana, U.S.A. Has large copper-refining industry. Pop. (1910) 10,134.

piece designed to cover the nose and mouth. The period of induction is usually less than one minute, and that of A. about forty seconds. The patient's eyes have a fixed appearance, and there is usually a duskiness of the face. Prolonged A. by nitrous oxide may be effected by the use of a nose-piece, through which the patient is encouraged to inhale the gas, expiring it through the mouth or through a valve in the nose-piece. It is thus possible to conduct dental operations lasting five or ten minutes, or even longer, but the method is not employed if there is much nasal or post-nasal obstruction.

Ethyl chloride (C_2H_5Cl) is used as a substitute for nitrous oxide in short operations, but it is not considered so safe. The after-effects often include headache and sickness.

Ether, $(C_2H_5)_2O$, is commonly used for operations of long duration. In the open method the ether is dropped on a gauze mask which is held at first some distance from the face and gradually brought nearer. By the use of a bag and face-piece, such as Clover's inhaler, A. is more quickly brought about.

Chloroform ($CHCl_3$) is administered at first in a dilute form and the percentage gradually increased, the supply of air and vapour being of course thoroughly under the control of the anæsthetist. Dangerous after-effects occasionally occur, and its administration is highly dangerous where the *status lymphaticus* exists. In cases where chloroform or ether may not be advisable, a mixture of two parts of chloroform to three of ether is often used, and is generally considered a safe and convenient anæsthetic.

Local A. or *analgesia* is chiefly employed in superficial operations or, where special circumstances make general A. inadvisable. Sometimes ether or ethyl chloride is sprayed on the skin until it freezes. Insensibility is produced for a short time and is only superficial. There is likely, too, to be considerable pain when the skin thaws. Cocaine is often injected for cutaneous and subcutaneous analgesia, but its use is attended with some disadvantages. It has a dangerous effect when absorbed into the general circulation, and there is also a risk of a cocaine habit being formed. Eucaine and novocaine are very effective analgesics for hypodermic injection, and have no dangerous by-effects.

Spinal analgesia.—There are sometimes occasions for serious operations when respiratory affections, alcoholism, diabetes, and other conditions make general A. inadvisable. If the operation is concerned with the lower part of the body, it is possible by a spinal injection to produce insensibility to pain in that part whilst general consciousness is maintained. Stovaine or novocaine is injected just below the second spine into the spinal fluid while the patient is in a sitting position, if that position is possible. The method has been used more on the Continent than in this country, where it is looked upon only as a substitute for general A.

In general, successful A. depends to a great extent on the proper preparation of the patient. The stomach should be empty at the time of the operation, so that no food can be forced up to lodge in the respiratory passages. Dangers during anæsthetisation are usually connected with the respiratory processes, and a skilful anæsthetist is always on the watch for any change for the worse. There is an impression abroad that deaths under anæsthetics are relatively on the increase, particularly in hospitals, but this is probably due to the fact that surgical measures are more often taken in desperate cases than heretofore, so that the enfeebled or diseased condition is really the cause of death rather than the anæsthetic. It may be said that with modern appliances and mixtures in the care of a trained anæsthetist the risk to a person whose general health is anything approaching the normal is comparatively slight.

Anagallis, a genus of Primulaceæ growing in all continents but Australia. *A. arvensis*, common to British corn-fields, is the brick-red pimpernel. It is also called *poor man's weather-glass*, as the flowers close in the afternoon and in dull and rainy weather.

Anagni, episcopal city of Italy, on a hill 36 m. S.E. of Rome. The bishopric dates from the fifth century, and the cathedral of Santa Maria from the eleventh. Pop. 9630.

Anagoge, or Anagogy, spiritual exaltation or insight; also the mystical interpretation of Scriptural narrative. In medicine the term is used to describe an upward rejection, as of the blood from the lungs.

Anagram (Gk. ἀνά, back, γράμμα, an alphabetical letter), the transposition of the letters of a word or short sentence, more often the name of a person, by which a new word or sentence is formed. It is the essence of the A. that the new sentence should have an appropriate connection with the original sentence, and no better example can be given than that of a mediæval anagrammatist who answered Pilate's question, 'Quid est veritas' (What is Truth ;) by 'Est vir

qui adest' (It is the man who is here). Pseudonyms are often made by A., one of the most celebrated, albeit far-fetched, being *Voltaire*, formed from 'Arouet l. j.' (Arouet le jeune). Although in the past great virtue was found in the A., especially by the Cabalists, modern taste may be said to be represented fairly, if strongly, by Addison, when he said that it was impossible to decide whether the inventor of the A. or the acrostic 'were the greater blockhead.'

Anah, a tn. on the Euphrates in Bagdad, Turkey in Asia, opposite which is a line of cultivated is. Its position in the desert made it an important resting-place, and it contains the remains of four anct. castles.

Anaheim, a city of Orange co., California, U.S.A., 24 m. S.E. of Los Angeles. Pop. 5526.

Anahuac, a geographical region of Mexico. The name was applied by the Aztecs to their whole kingdom, but its boundaries are not definitely known, and the term is now loosely used with regard to the great central plateau of Mexico. By some it is applied to this whole region, from Rio Grande to Tehuantepec, but it is more properly used of the plateau-valley of the city of Mexico, between 18° 4′ and 20° 3′ N. lat., having a mean elevation of 7500 ft. This region was formerly largely covered by lakes, which fits the meaning of the name 'on the water,' and is now the granary and stock-raising centre of the country.

Anakapalle, tn., Madras, India, 18 m. S.W. of Vizagapatam. Two miles off there are interesting Buddhist remains, preserved as ancient monuments. Pop. 18,000.

Anakim, an O.T. term for a section of the pre-Israelitic inhab. of Canaan. They are represented as a race of giants (sons of Anak = a giant), living in S. Palestine, and were conquered by Joshua. Their chief stronghold was Kirjath-Arba.

Analecta, a collection of extracts from different authors, an anthology.

Analects of Confucius, *see* CONFUCIUS.

Analeptics (Gk. ἀνά, again, λῆψις, taking) is a medical term which comprises the means employed in restoring vigour to the system by diet or exercise. In dietary analeptic foods do not include stimulants with temporary action, but rich and nutritious foods which are of real restorative and permanent action, *e.g.* arrow-root, eggs, milk, and soups.

Analgesics, *see* ANODYNES.

Analogy (Gk. ἀναλογία, proportion) is a term which originally implied an equality of ratios, but though anct. writers used it in this sense and it is still used with this meaning in mathematics, it is now used in many depts. of learning to signify resemblance which falls short of absolute identity. In inductive logic it forms the basis of most hypotheses, but it is subject to much fallacious reasoning. The reasoning runs on such lines as these: A and B resemble each other in possessing one or more similar characteristics; A possesses a certain additional characteristic, and B therefore probably possesses it also. In many cases such a train of thought will bring a true conclusion, as scientists can prove in hundreds of instances, but they usually require a mind which is capable of grasping what are the important points of the A. and forming a judgment from them alone.

A. can never afford proof; at best it is but a suggestion for a good hypothesis. Metaphorical language may be a source of incorrect reasoning by A., *e.g.* in speaking of a country as being a mother-country and from this arguing that the duties of the country towards the individual should be those of a mother towards her child. *See* J. S. Mill's *System of Logic*, 1875; W. S. Jevons' *Principles of Science*, 1877.

Analogy, in biology, is a term applied to organs which perform the same functions though in shape and general structure they may be totally different. The wings of a bee and of a sparrow are analogous, and the leaf-like branches of butcher's broom are analogues of the leaves of ordinary plants. *See* HOMOLOGY.

Analysis (Gk. ἀνί, up, λύειν, to loose), in philosophy, implies the mental act of unloosening some unity into its component parts, *e.g.* the dissection in thought of a man into his various attributes of height, weight, reasoning powers, and so on. Synthesis is its complement, and implies the converse process of knitting together the parts to form the unity, *e.g.* the description of his various attributes, until the man is complete. A. plays a great part in inductive logic, for it opens with the complex of experience and resolves it into the elementary relations realised in it; in this way it is largely experimental and leads to discovery. The propositions set forth in geometry illustrate this; they are, however, usually synthetic in proof, but the *reductio ad absurdum* is wholly analytical. *See* *Port Royal Logic*, 1808; D. Stewart's *Philosophy of the Human Mind*, 1818.

Analysis, Chemical, the determination of the elements comprising a compound or a mixture of compounds. For inorganic compounds or mixtures the methods may be divided into dry and wet A. Dry methods

usually only give an approximate result, and should be supplemented by wet methods, if possible. The chief processes in a dry A. comprise heating to determine what sublimate is formed, what gas is evolved, or what water of crystallisation given up, or whether any of the substances are oxidised. Heating on charcoal in a reducing flame would possibly give a ... ther indications, ... x on a platinum ... flame produces ... colours characteristic of the various metals. The flame test consists of heating a small portion moistened with hydrochloric acid in the high-temperature area of a Bunsen flame, when a characteristic colour may be imparted. Such methods obviously only give a general idea of the constituents of the mixture or compound; some elements may be masked by others unless a spectroscope (*q.v.*) be employed, when the presence of different elements in a flame test is very accurately indicated.

Wet methods consist of treating the given compound or mixture with reagents in a systematic manner, so that by the nature of the reactions produced, certain groups of elements are indicated, further tests subdividing these groups and so on until the original compound is split up into the simplest possible forms. Such an A. is called quantitative, because it takes no account directly of the relative proportions of the constituents. If those proportions be required, quantitative A. must be employed, which may be either gravimetric, volumetric, or colorimetric. In gravimetric methods it is designed to obtain a precipitate of known composition from a weighed quantity of the compound. This being carefully filtered, dried, and weighed, a simple calculation gives the percentage of the required element in the original mixture. Occasionally electrolysis of the given solution is resorted to, the amount of metal deposited on the cathode indicating the strength of the solution. Volumetric methods aim at determining the strength of a solution of the substance by finding what quantity is required to bring about a certain definite reaction with another solution of known strength. Certain elements which give well-defined colour reactions with other substances can be determined quantitatively by comparing the colour produced by known weights of the substance with those produced by a standard solution.

The A. of organic compounds proceeds upon entirely different lines. If on burning a small quantity an ash or residue is left, the substance probably contains an inorganic impurity, which may be separated by the use of solvents, such as alcohol, ether, benzene, chloroform, etc., one or the other of which dissolve the majority of organic compounds, when filtration and subsequent crystallisation in fractions may effect still further separatior ... that is, di... tures, is ... whose bo... different. The elements composing organic substances can be detected by characteristic tests; carbon by the formation of carbon dioxide turning lime-water turbid; hydrogen by the formation of water on decomposition; halogens by heating with sodium, when a sodium halide is formed; *nitrogen* by the evolution of ammonia on heating with lime; sulphur and phosphorus by oxidising to acids on heating with a mixture of potassium carbonate and nitre. The general principle u... determinat... collection... ducts of ... quantity of the substance. In recent years, accurate methods of qualitative and quantitative A. of very minute quantities of substance have been worked out (*micro-analysis*), *e.g.* by F. Pregl, and these methods have proved exceedingly useful and importan... where the amount ... for A. is often ...

Moder... ructure of the a... levelopment of ... ased on electrical phenomena, and Sir J. J. Thomson's method of positive-ray A. enables us to detect even a trace of a ... the presence of ... others. See F. ... *Qualitative Analysis and Practical Chemistry*, 1908; Clowes and Coleman, *Quantitative Chemical Analysis*, 1909; Allen, *Comme... Analysis*, 1909–10; F. ... *Analysis*, 1924; ... *Analytical Chemistry*, 2 vols., 1924; Thorpe and Whitley, *Manual of Organic Chemical Analysis*, 1926.

Analyst, Public, an official appointed by a county or borough council under the provisions of the Food and Drugs Acts, 1875 and 1899, for the purpose of analysing samples of food and drugs and agric. products exposed for sale. The appointment must be confirmed by the Local Government Board or the Board of Agriculture, and the appointment cannot be annulled without the assent of whichever of these depts. is concerned. Under the latter act both depts. are empowered to appoint a

public A. where the local authority has failed to do so. The P. A. is generally a F.I.C. (Fellow of the Institute of Chemistry). For his duties see article on ADULTERATION.

Analytical (also known as explicative or essential) **Propositions** are those which affirm of their subject a predicate which is already contained in the definition of the subject. Such a proposition is, 'A parallelogram has four sides and four angles, the having four sides and four angles being part of the definition of a parallelogram.' A. P. are distinguished from *synthetical* propositions, which affirm of their subject a predicate not already contained in the definition, such as, 'A parallelogram is a distressful subject to the unintelligent schoolboy.'

Anamalai, or Annamullay, Hills, a group of mts. forming part of the Sahyadri range, S. India, about 65 m. S. of the Nilgiri Hills. The highest peak, Anamudi, is the loftiest point in S. India, attaining an elevation of 8850 ft. Tea and coffee are extensively grown here, and there is abundance of teak timber and wild beasts, such as the elephant and bison.

Anambas Islands, a group of small wooded and rocky is. in the Dutch E. Indies, between Borneo and Malacca.

Anamirta is a small genus of Menispermaceæ found in Malacca. *A. Cocculus*, known as *Cocculus Indicus*, has a seed which is used in the adulteration of porter.

Anamnesia (Gk. ἀνά, again, μνῆσις, memory), a term used in medicine to signify the recollection of a patient or his friends of the first symptoms and past history of his case.

Anamour, or Anamur, Cape, is the most S. point in Asia Minor. It is named from A., the anct. Anemurium, in which there are ruins of tombs and two theatres. A. Castle is 6 m. E. of the cape.

Ananas, a genus of S. American plants of the order Bromeliaceæ. *A. sativus*, the pineapple, is the best-known species; for a description of its fruit *see* PINEAPPLE.

Ananchytes (Gk. ἀνάγχειν, to press), a genus of fossil of the order Spatangoida. It has an oblong test, superficial ambulacra, the largest pores near the peristome and apex. It is the type of the family Ananchytidæ, and is found in the upper Cretaceous system.

Ananias, a name borne by three characters in the N.T.: 1. A Jewish Christian of the young church at Jerusalem, who, with his wife Sapphira, was miraculously struck dead by Peter for making a false representation in respect of their gift of property to the community (Acts v.). 2. A Jewish Christian of Damascus, mentioned in connection with the conversion and baptism of St. Paul at that place (Acts ix.). 3. A Jewish high priest, who officiated at the trial of St. Paul before the Sanhedrin at Jerusalem and at Cæsarea (Acts xxiii. xxiv.). He was the son of Nedebaios, and high priest about A.D. 47–59.

Ananiev, a tn. in gov. of Kherson, Russia, on R. Tiligul, 95 m. N. of Odessa. Has some trade in agric. products. Pop. 16,900.

Anapa, seaport in Kuban dist., Russia, on the Black Sea. Founded as a fortress in 1771 by the Turks, it was frequently taken and lost by Russia and finally annexed in 1829. The old rampart is now a promenade. Pop. 7000.

Anapæst, in poetry a metrical foot, consisting of two short, or unaccented syllables followed by a long, or accented syllable. It is the opposite to the dactyle, which has one long syllable followed by two short, and is sometimes called the antidactyle. Examples: 'temporal,' dactyle; 'interrupt,' A. The A. was often employed in Gk. and Rom. poetry, but its employment in England is generally restricted to the lighter forms of verse. In France the use of the A. is very general, forming indeed one of the marked characteristics of Fr. poetry. Aristophanes and Tyrtæus among the ancts. and Swinburne in our time have employed the A. with good effect.

Anapli, *see* NAUPLIA.

Anarchism (Gk. ἀν, not, and ἀρχν, rule). Few words are more difficult to define than this, and yet there is perhaps no word in respect to which it is of more importance that *ex parte* statements be not accepted. The discussion of A. often engenders more heat than light, much of this doubtless being due to the obsession of the opponent's mind by the 'propaganda by deed' practised by some supporters of A., and to which reference will be made later. The difficulty in definition arises from two causes, the first being inherent in the nature of the subject, and the second being that most of the adherents of the theory or theories of A. in the past have been poor, often uneducated working-men with that incoherence of thought which springs from a blind feeling of injustice and from privations actually experienced. Briefly, A. may be defined as the negation of gov., as a state of society without a central gov., and in which individual autonomy is allowed its fullest development. The term *anarchy* is used to imply that state of turmoil which has usually accompanied the weakening of central gov., or the, usually brief, period when there is no gov., but it is en-

tirely erroneous to suppose that 'red ruin and the breaking up of law' is the inevitable concomitant of A. It is questionable whether anarchist theories can be applied to our modern complicated civilisation, but the anarchist can justifiably point to the condition of peaceful happiness pertaining in primitive communities like the early Christian church, or, before the Revolution in that country, the Russian *mir*, or vil. commune, in which many of his theories have been applied. To no school of thought is the Lat. proverb *Quot homines, tot sententiæ*, 'Many men, many minds,' more applicable, for by its insistence on, not to say exaggeration of, the importance of individual opinion and its repudiation of all authority, human or divine, in the domain of thought as well as in the sphere of action, A. is saddled with responsibility for the views of any individual, however unbalanced, however criminal, who chooses to label himself an anarchist. Of late years attempts have been made by anarchists by means of international conferences, notably that of Amsterdam, 1907, to define their position, and in a negative way their difference from Socialism (*q.v.*) was made plain by the expulsion of the anarchists, led by Bakunin, from the International (*q.v.*) at The Hague Conference, 1872. Many of the tenets of socialism are held by anarchists, and their common opposition to the present order of society is a bond between them. Although the extreme forms of socialism and of A. are as the poles asunder, and only ignorant or malicious per-ons confuse the two, yet the various ues of socialism and A. shade into ach other by insensible gradations, he whole forming a body of opinion ctuated mainly by a hostility to the resent estab. order, especially in at which touches the ownership of operty. Libertarian socialism and mmunist A. are practically synony-ous terms, and the systematic struction of property (sabotage) ctised by the 'direct actionist' or -parliamentary socialists of France elsewhere (also called Syndicalists) ittle removed from the 'propa-da by deed' of the physical force rchists. The freedom of the in-ual being restricted by the opoly of land and capital by a , the anarchist is at one with the list in the desire to overthrow monopoly, but they differ funda-ally on the question in whom roperty should be vested, and governance of the remodelled . The state socialist's remedy at he conceives to be the evils ent-day society is more govern-ment and better gov. The anarch retorts that all govs., however w intentioned, are bad and tend t wards privilege and oppression, an that the individual is just as much slave if he has unwillingly to confor to the majority as if he conforms t a despot. Their views are crystal lised in the sentence, 'That gov. i best which governs least,' and in this conclusion they are not far removed from such *individualists* as Herbert Spencer, Auberon Herbert, and Harold Cox. The way of sanity—and happiness—lies probably in that 'happy mean' between these two extremes, and the advance of civilisation will be like a stream meandering down a valley, turning first to this side and then to that, as the relationships of individual to state and state to individual are incessantly readjusted.

The modern anarchist movement may be said to have begun with Pierre Proudhon (1809–65), although an atmosphere favourable to its reception had been created by the writings of the poet Shelley and the Fr. encyclopædists. Proudhon's most celebrated work is that entitled *What is Property?* which he answers by the monosyllable, 'Theft.' He asserted that in a perfect society order would be maintained by the reasonable self-control of the free individual. Since his time perhaps the greatest anarchist was Michel Bakunin, the Russian, the Apostle Paul of A. (1814–76). In addition to writing many uncompromising works, including the atheistic *Dieu et l'Etat*, he will be chiefly remembered for his prolonged struggle in the International with the followers of Karl Marx, the father of orthodox socialism. From this struggle Marx emerged victorious, but Bakunin had a large following, especially among the Latin states, and till this day Barcelona, the largest industrial city of Spain, may be said to be a hot-bed of A. In recent years A. has numbered among its supporters many men of genius and erudition. Prince Peter Kropotkin, Russian, and Enrico Malatesta, It., made England their home, and the former wrote many scholarly works on Nihilism (*q.v.*), a form of A., chief among them being *Fields, Factories, and Workshops*; *The Conquest of Bread*; *The Memoirs of a Revolutionist*, and the moving little brochure *An Appeal to the Young*. The return to the simplicity of the primitive Christians advocated by Count Leo Tolstoy has given rise to the term Tolstoyan anarchy. Prominent Fr. anarchists include Elisée Réclus, Sébastien Faure, Charles Malato, and Louise Michel; It., Amilcare Cipriani; Spanish, F. Ferrer; American, Emma

Goldmann and Benjamin Tucker. The anarchist press is a weak, fluctuating thing, generally badly written and poorly printed, and its chief organ in Great Britain is a monthly sheet called *Freedom*. 'Propaganda by deed,' repudiated by many leading anarchists, is the violent attacks made upon rulers and sometimes indiscriminately on the better-off members of society, the *bourgeoisie*, by pistol, knife, and bomb. Whether arising from the mistaken idea that society or gov. could be terrorised into abdicating its functions, or from the desperation of unbalanced, police-hounded starvelings, it has a long list of crimes to its 'credit.' Britain's comparative immunity from these attacks has been attributed to the fact that it has no exceptional laws directed against A. Among rulers to perish by the hands of anarchists are: President Carnot of France, 1894; Empress Elizabeth of Austria, 1898; King Humbert of Italy, 1900; President M'Kinley of U.S.A., 1901. Ravachol (1892), Vaillant (1893), and Henry (1894) were all executed in Paris for bomb outrages on the public, and the last attempted bomb outrage in England (1894), made by Bourdin, who purposed destroying the observatory at Greenwich, ended in the death of the would-be author by the premature explosion of his infernal machine.

Anarrhicas, a genus of Acanthopterygious osseous fishes, very nearly allied to the Blennies. They have round smooth blunt heads; elongated bodies, covered with minute scales; a single long dorsal and an extended anal fin, both separated from the caudal; no ventrals; the mouth armed with formidable teeth. One species, the wolf-fish, sea-cat, or cat-fish, *A. lupus* of Linnæus is common in the northern seas and on the E. coast of Scotland and the Orkneys.

Anas (Lat., a duck), the scientific name for a duck (*q.v.*).

Anasarca, dropsy of the subcutaneous cellular tissue. There are several forms of the disorder, one being known as *A. americana*, the S. American sleeping-sickness.

Anastasius: 1. Pope, 398-402; chiefly remembered by his opposition to the writings of Origen, whose advocate, Rufinus, he excommunicated. 2. A. I., surnamed Dicorus, Byzantine emperor 491-518, succeeding Zeno, whose wife, Ariadne, he married. Ruled with great energy and justice. His reign was disturbed by the Isaurian (492-6) and the Persian wars (503-5), and by invasions of Slavs, Huns, and Bulgarians. 3. A. II., surnamed Artemius, Byzantine emperor 713-16. Deposed by a mutiny of the navy, which proclaimed Theodosius III. in his place. A. became a monk in Thessalonica, but later headed a revolt against Leo, the successor of Theodosius, and was executed.

Anastomosis, the intercommunication of blood-vessels, so that the supply of blood to any part of the body is not wholly dependent upon one channel; it is particularly free round joints. The term is extended to apply to the establishment of a communication between two hollow parts, or two different portions, of the same organ.

Anata, a vil. of Palestine, 3 m. N.E. of Jerusalem. It is supposed to occupy the site of the anct. Anathoth, the bp. of Jeremiah. It possesses various ancient remains.

Anatase (Gk. ἀνάτασις, extension), or Octahedrite, also called Oisanite and Dauphinite, is a mineral form of titanium dioxide. The crystals have either many pyramidal faces or occur as simple acute double pyramids. They are found in granite crevices in Switzerland and the Bourg d'Oisans in Dauphiné.

Anathema, literally 'that which is set aside, or offered.' Used by the Gks. in respect of gifts made to the gods either in gratitude or for propitiation. As animals so offered were condemned to death, the word has gained a secondary sense of perdition. The word A. was used by the Catholic Church as part of the formula in the excommunication of heretics. In 1 Cor. xvi. 22 occur the words: 'If any man love not the *Lord Jesus Christ*, let him be Anathema Maranatha.' The word Maranatha has for this reason erroneously been thought to be an amplification of the curse, but its meaning is merely 'the Lord cometh.'

Anatidæ (Lat. *anas*, duck), a family of web-footed birds belonging to the div. Carinatæ of the order Neornithes. It includes swans, geese, and ducks among its 150 or so species.

Anatolia, the Gk. name for Asia Minor. *See* Asia Minor.

Anatoliko, or **Ætolikon**, a tn. of Greece, built on an is. 6 m. N. of Missolonghi. It exports fish and oil, and cultivates the vine and olive. Pop. 5500.

Anatomy, or **Morphology**, the study of the form or structure of a living thing. Thus there are two principal divs., vegetable A. and animal A. If the latter is concerned with the structures of various classes of animals as compared with one another it is called *Comparative A.* When a particular species of animal is the object of study the science is *Special A.*, of which *Human A.* therefore forms a branch.

this latter sense that the term 'anatomy' is generally applied. It consists of the observation of the form of the various organs and tissues, the materials of which they are composed, and their possible variations, as distinct from physiology, which deals with the functions of those parts. Thus the work of the anatomist is to investigate and describe the shape, size, position, and construction of organs, etc.; he will, for instance, describe the various parts of the liver, the substances of which it is composed, and the position of the liver with regard to other organs, whilst the physiologist will deal with the problem of how the liver makes bile, and how the work it does affects the constitution of the blood and the whole process of nutrition. Human A. itself is a wide subject, to be approached from sev. points of view, and the investigation of a single part has provided a life-long study for many a scientist. *Descriptive A.* is a study of the separate and individual parts of the body, apart from their relationship to surrounding parts; *Microscopic A.* deals with facts gleaned from microscopical examination; *Morbid* or *Pathological A.* is a study of diseased or abnormal structures; and *Practical A.* deals with the body as a subject for dissection. *Artistic* or *Surface A.* is an allied subject, and deals with the position of the various structures only so far as they affect the outward appearance for the purpose of representation by painting, sculpure, etc.

The organs may be classified according to function into systems, as the *skeletal system*, comprising the bones and ligaments; the *muscular system*; the *respiratory system*, comprising the lungs, windpipe, diaphragm, etc.; the *circulatory system*, comprising the heart and blood-vessels; the *alimentary system*, comprising the stomach, intestines, liver, and all those organs concerned with nutrition; the ... *ory system*, com... ladder, etc.; ... omprising t... ...ries, testes, etc.; nd the *nervous system*, comprising e brain, spinal cord, nerves, and gans of sense. The organs are comsed of tissues, of which the epielial, the connective, the muscular, l the nervous tissues may be taken the principal groups.

The introduction of radiography medical science has been of ofit not only to the physiologist, also to the anatomist. In the *ng* body the anatomist is now to study the inter-dependence arious organs during life, to find vhere weight is exerted in natural mstances, to discover at what age and at what precise points ossification of the bones takes place and he is also enabled to determine the normal positions of such organs as the heart and the stomach while performing their ordinary functions.

When an *X*-ray photograph has been taken of the bones, the shadow-picture is made clear because of the solidity of the bones, but where the stomach is under review a 'test meal' of some such nature as porridge mixed with the innocuous and tasteless carbonate of bismuth is administered to make the organ opaque to the anatomist. By the injection of compounds of iodine into the lungs, and of oxygen into the brain, these organs are also enabled to show up clearly in the *X*-ray photographs.

A good general text-book of Anatomy is *Quain's Elements of Anatomy*, in 4 vols., edited by Schäfer, Symington, and Bryce. Consult also A. M. Buchanan's *Manual of Anatomy*, 1925; H. Gray's *Anatomy, Descriptive and Applied* (23rd ed., edited by Robert Howden), 1926. The various parts of the body are treated under separate articles.

Anaxagoras (*c.* 500–428 B.C.), Gk. philosopher, *b.* at Clazomenæ, Ionia. About 464 he went to Athens and taught there for thirty years, among his pupils being Pericles, Euripides, and perhaps Socrates. He exerted great influence, both on account of his mathematical and astronomical wisdom and the ascetic dignity and strength of his character. His attempts to explain physical phenomena by natural means laid him open to the charge of impiety. He was acquitted after being defended by Pericles, but left Athens for Lampsacus on the Hellespont, where he *d.* He laid the foundations of the atomic theory, and believed in an infinite intelligence in the universe.

The chief treatise of A. was on nature, sev. fragments of which have been preserved by Simplicius and others. Vitruvius attributes to him a work on perspective.

The leading notion of A. was that all things were in a state of confusion till Nous (intelligence) placed them in order. Many strange opinions on physical philosophy are attributed to him. He said that the sun was a mass of hot iron larger than the Peloponnesus: his opinion that the moon derived her light from the sun is probably not his own. His fragments were collected by W. Schorn, Bonn, 1829.

Anaxarchus of Abdera (fourth century B.C.), Gk. philosopher, and intimate friend of Alexander the Great, to whom he is supposed to have spoken with the greatest liberty.

...ory is told of him that when, ...instructions of Nicocreon, the ...of Egypt, whose hatred he had ...d, he was pounded in a mortar, ...ed out, 'You may crush my ...but you cannot crush my soul.' ...reached the doctrine that the ...st happiness was to be found in ...e.

Anaximander, Gk. philosopher, *b.* ...letus, Ionia, c. 611 B.C. Little ...own of his life. He probably *d.* ...7 B.C. He was a pupil of Thales, ...udent of astronomy and geo... ...hy, a pioneer of exact science, ...the author of a theory of nature ...inating in an indeterminate 'first ...ciple.'

Anaximenes, Gk. philosopher, *b.* at ...etus, Ionia, in the latter part of ...sixth century B.C. Said to have ...n a pupil of Anaximander. He ...sidered air to be the source of all ...tter, from which it (matter) was ...rmed by condensation.

Anbury and Club-root, a species of ...lls produced by insects on the roots ...cabbages, and other cultiv. plants.

Ancachs, a coast prov. of Central ...eru. Area 16,500 sq. m. Lies partly ...n the Cordilleras, partly in the ...arañon R. valley, and partly on arid ...oast land. Produces wheat, barley, ...coffee, and tropical fruits; mining is ...an important industry. Pop. (est.) ...500,000. Chief tn. Huaraz (cap.).

Ancelot, J. A. (1794–1854), Fr. dram... ...atist and journalist, *b.* at Havre. Became a member of the Academy, 1841. His dramas were very popular.

Ancenis, a tn., dept. Loire-Inférieure, France; situated on the Loire, 21 m. N.E. of Nantes. Pop. 14,762.

Ancestor Worship, the basis of many religions, and by some extremists maintained to be the basis of all religions. The line of demarcation between gods and men is clearly and distinctly drawn in Greece, but Euhemerus expounded a theory that the gods of Greece were merely men who had gradually acquired divine honours on account of exceptional prowess or benevolence during their lifetime. This type of rationalism is called, after the originator, Euhemerism. Thus even Zeus, the supreme god of the Pantheon, was merely an heroic warrior, whose tomb was located in Crete. The application of this theory to the gods of Greece in general is extravagant, though there is a shade of justness in its application to the origin of the worship of Dionysius and Heracles. While the worship of the gods, as such, in Greece is on the whole distinct from A.W., the worship of heroes was a prominent feature of Gk. ritual, but this worship did not lead to deification. The same distinction is true of Rom. worship. Spirits of the dead, called 'manes,' were worshipped with ritual distinct from that bestowed on the gods. They dwelt in the under-world, and access to their abode was obtained through the 'lapis manalis,' a stone covering the entrance to a pit; and these 'manes' were regarded as partaking of food and drink. It is characteristic of the spiritual nature of Heb. religion that A. W. was not practised. A. W. is undeniably the basis of religion in China and Japan. The Hindus also attached great importance to the power of departed spirits, and believed that all their actions were regarded by these deities. The totem-pillar is characteristic of the worship of the American-Indian, and the 'ancestor-tablet' was the object of strict veneration among the Maoris. A. W., therefore, is a characteristic of the religion of most primitive peoples, and in many cases results in deification. The subject is exhaustively treated by Herbert Spencer in his *Principles of Sociology*.

Anchises was the son of Capys and Themis, the daughter of Ilus, and King of Dardanus on Mt. Ida. He became the father of Æneas by Aphrodite. He was struck by lightning and became blind for having boasted of his intercourse with the goddess. When Troy was captured by the Gks., A. at first refused to leave the tn., but was at last persuaded to do so by Æneas, who carried him on his shoulders from the burning city. (*See* Virgil's *Æneid*, ii.) A. *d.* soon after Æneas arrived in Sicily, and was buried on Mt. Eryx.

Anchitherium (Gk. ἄγχι, near, θηρίον, wild beast), a genus of mammiferous fossils of the Upper and Lower Miocene found in Europe and N. America. It was related to the horse, and resembles that species more closely than any of the Palæotheriidæ. It belongs to the div. Perissodactyla of the order Ungulata. Each limb had three toes, a large central one and two smaller lateral ones.

Anchor, an instrument used for the purpose of fixing the position of a ship by fastening it temporarily to the bottom of a riv. or sea. The word is derived from the Gk. ἄγκυρα, meaning a hook. By its use drifting with currents, tides, and wind is prevented. The A. is attached to the ship by a cable. It is of early origin, though the primitive forms it took were not more scientific than large stones or sacks of sand. The first hook A. has been traced to the Gks. The modern implement is composed of the following parts: a vertical beam called a 'shank,' at the upper end of which is a metal ring called a 'shackle'; just beneath the shackle

is a cross-beam called the 'stock.' From the other end, called the 'crown,' two arms extend at right angles to the 'stock' and curve upwards. They terminate in broad wedges called 'palms' or 'blades,' the pointed ends of which are termed 'bills.' The As. used by the Admiralty bear no stock, and have movable blades so arranged that they grip the bed of the sea irrespective of any position the A. may assume. This type is known as the Wasteney-Smith.

Anchorage. In special areas, a fee is chargeable to the captains of those vessels who wish to cast anchor in them. Generally the ownership of the area is restricted to the state which receives the toll, but sometimes private companies and, rarely, separate individuals own the reserved water. The word also means anchor-ground, *i.e.* a bed composed of stiff clay or firm sand.

Anchor ice (ground ice) is a form of ice which adheres to the bottom of only those waters which are characterised by a never-ceasing tempestuous motion. The ice is very porous, and as it rises it often brings to the surface any matter to which it may be adhering. It only forms in a temp. lower than 10° F. Until zero its adherence to the bottom is not of any strength.

Anchor Line of steamships, of Glasgow and Liverpool, was founded in 1852, and with a numerous fleet maintains services between Glasgow and New York, between the United Kingdom and Calcutta and Bombay, and between New York and certain of the Mediterranean ports. The correct style of the company is The Anchor Line (Henderson Bros.). Ltd.

Anchorite, one who voluntarily secludes himself from all intercourse with his fellow-mortals for the purpose of undisturbed and holy reflection. Among the attendant, and in some part, necessary, practices was a rigid asceticism. The first A. was Paul of the Thebaid (Egypt), among his followers being the famous St. Anthony.

Anchovy, a small fish belonging to he herring family. It is found bundantly round European coasts, articularly those of the Mediteranean. It is recognised by the eeply-marked fork of its tail, the rk green of its back, and the proction of its snout over the under rt of the mouth. The industry has clined recently. A light is used to ract them and a net accomplishes ir capture. This takes place near shore, to which they make for the poses of depositing spawn.

nchovy Pear, a tree indigenous to marshy dists. of Jamaica and the W. Indian Is. It attains a heigh 50 ft. and bears leaves from 2 to 3 long. The fruit resembles the Indian mango.

Anchusa, a genus of plants of t order Boraginaceæ, two species which are found in Britain. They a employed in the manufacture of dy and medicines. *A. officinalis* is th alkanet or bugloss; *A. tinctoria* th dyer's bugloss or alkanet.

Ancient Demesne, a term whic signifies estates or manors vested in the king at the time of the Norman conquest. Freedom from many of the prevalent duties attached to tenants was a privilege attached to them; among these exemptions were freedom from the Danegeld, from tolls and duties, from fines, and from sitting on juries. The conditions attached to their ownership gave rise to the modern 'freehold' property.

Ancient Lights, see LIGHTS.

Ancient Mariner, the famous poem of Samuel Taylor Coleridge, was first pub. in the *Lyrical Ballads* of 1798. Its theme is the superstition which attaches dire consequences to the killing of an albatross, and its moral that 'He prayeth best, who loveth best All things both great and small.'

Ancients and Moderns. The celebrated controversy between the A. and M. which raged in Fr. and Eng. literary circles at the end of the seventeenth and beginning of the eighteenth centuries centred on the respective merits of classical and modern literature. Though not the first protest against the worship of the classics, the *Traité pour juger des Poètes Grecs, Latins, et Français* of Desmarets de Saint-Sorlin, pub. in 1670, in which he attacks Homer and Virgil, and the work of the same author entitled *Discours pour prouver que les Sujets Chrétiens sont les seuls Propres à la Poésie Héroïque*, may be said to have actually started the dispute. For these he received severe handling from Boileau in his *Art Poétique* (1674), to which Desmarets replied with his *Défense du Poème Héroïque*, 1674, and *Défense de la Poésie et de la Langue Française*, 1675. Subsequently the cause of the M. found its chief champions in the brothers Perrault, who for many years kept up the dispute with such doughty opponents as Boileau and Racine. An important contribution to the case of the M. was Fontenelle's *Digression sur les Anciens et les Modernes*, 1688. In England the dispute commenced with the publication of Sir William Temple's *Essay upon the Ancient and Modern Learning*, 1692, written from the classical side, and answered by Wotton's *Reflections upon Ancient and Modern Learning*. In his defence

of [illegible]
enc[illegible]
Be[illegible]
scholar of the day, who secured a signal triumph in the controversy by proving the spuriousness of the *Letters of Phalaris,* upon which Temple had bestowed high praise. The outstanding literary contribution to the discussion is Swift's *Battle of the Books,* 1704, written in favour of the classical view.

Ancilla (Lat. *ancilla*, handmaiden), or Ancillaria, the name given by Lamarck to a genus of spiral, univalve, marine shells belonging to the family Olividæ. They are chiefly confined to tropical climates, and are found in the Cretaceous system. They are gastropod molluscs of the order Ctenobranchiata.

Ancillon, Charles (1659–1715), historian and a staunch defender of the Protestant cause, was a native of Metz and son of the noted Protestant divine, David A. He practised law for some time at Metz, and was subsequently appointed by the Elector of Brandenburg to be judge and director of the Fr. refugees in Berlin. His chief works are: *L'Irrévocabilité de l'Edit de Nantes,* 1688; *Histoire de l'Etablissement des Françaises Réfugées dans le Brandebourg,* 1690; and *Histoire de Soliman II.,* 1706.

Ancillon, David (1617–92), a learned Fr. Protestant clergyman, was *b.* at Metz and *d.* at Berlin. In 1641 he was licensed to preach by the synod of Charenton, and appointed minister at Meaux; but he returned to Metz in 1653. There he remained until the revocation of the Edict of Nantes, 1685, when he went to Frankfort and afterwards to Berlin. He wrote works in defence of the reformed faith and also *Mélange Critique de Littérature recueilli des Conversations de feu M. Ancillon* (Basle, 1698).

Ancillon, Johan Peter Friedrich (1767–1837), a Frenchman *b.* in Berlin. His family had emigrated during the revolution that followed the revocation of the Edict of Nantes. In Berlin he became tutor to the crown prince of Prussia. He is celebrated as the author of *Révolutions du Système Politique de l'Europe.* In 1832 he was appointed Foreign Minister.

Ancon, or Port Ancon, a S. American seaport in the dept. of Lima, Peru. Pop. 3000.

Ancona is the cap. of the prov. of that name in Italy. It is situated on the shores of the Adriatic Sea. Its name is derived from the Lat. *ancona*, which means a bend, its position being on a bend of the coast. It is the most important seaport between Venice and Brindisi, and is a railway centre. Its position renders it advantageous as a naval station. Many steamship routes have a terminus at A. Its chief exports include grain, hemp, goat-skins, and silk. The tn. possesses a fine cathedral. About 390 B.C. it was used as a colony by the Syracusans. In the middle ages it became a republic, and later it was annexed to the papal states. The Sardinians captured it in 1860 . Its harbour is the finest on the S.W. coast of the Adriatic Sea. Asphalte and calcium carbide abound in large quantities and are extensively exported. Pop. 66,000.

Ancona, The. An It. liner sunk by an Austrian submarine in 1915 in the Great War. Several United States citizens perished. The Austrian reply to the American Note of Protest alleged their belief that the vessel was a transport and that in any case she tried to escape. It was further alleged that the submarine commander used 'great care in torpedoing the boat so that the passengers might have time to save themselves before the vessel sank.' The entire blame was put by the reply on the *Ancona's* crew, but indemnities were promised for the Americans lost.

Ancona, Alessandro d' (1835–1914), It. man of letters, a native of Pisa, educated at Florence and Turin. At the latter place he took a prominent part in the agitation preceding the war of independence and represented the Tuscan Liberal party. In 1859 he founded and for some time edited *La Nazione.* In 1860 he was appointed professor of Italian literature at the University of Pisa. He ed. Dante's *Vita Nuova,* and various other works of Italian writers. Among his original works on literary and dramatic subjects, may be mentioned: *Sacre Rappresentazioni dei Secoli XIV., XV., e XVI.,* 1872; *Origini del Teatro in Italia,* 1877; *I Precursori de Dante,* 1874; and *La Poesia Popolare Italiana,* 1878. In 1882 was pub. his autobiography, under the title of *Il Primo Passo.*

Ancre, Battle of the. This battle was merely an extension of the great Somme Battle of July to Aug. 1916. It was fought in mid-November, and was the only British effort on the W. front between the Somme Battle of 1916 and Arras in April 1917. The Gers. were entrenched in chalk and clay excavations near the riv. The capture of the Schwaben Redoubt in the Somme Battle had left the British 5th Army in a good position N. of Thiepval for enfilading these excavations. There actual attack began, after two days' artillery bombardment, on Nov. 13, in a thick mist at 6 a.m., three British Divisions

under Gough taking part, the 31st (chiefly Yorkshire battalions) being foremost in the advance. Together with these were machine-gun sections of the Lucknow and Sialkot Cavalry Brigades, who repulsed a severe counter-attack four hours later. Great losses were sustained by the 3rd Division on the S. of the 31st Division on ground between Serre and the riv., a strip of ground on which a quite extraordinary number of British soldiers fell in the course of the War. Some success was obtained by the 2nd Division on the right of the 3rd; but the divisions which were operating further S. where the high ground between Serre and Beaumont Hamel gave protection from the Ger. artillery at Bucquoy in the N., fared much better, capturing St. Pierre Diviers village and Beaucourt and clearing the enemy from the last trench-system between the British front and the riv. Co-operating with these infantry divisions was the 63rd Naval Division, some of the men of which had fought at Antwerp in 1914, and which comprised 10,000 men, who attacked N. of the riv. under a fortuitous screen of dark and misty weather. Heavy losses were, however, suffered in the centre of this division through a formidable concealed Ger. redoubt bristling with machine-guns. It was not till 7 p.m. that the actual assault on Beaucourt was ordered. The charge was directed by Commander Freyburg of the *Hood* (Naval) Brigade, and was undertaken with great dash by combined sailors, riflemen (Rifle Brigade and Royal Fusiliers), and members of the H.A.C. The riflemen, reappearing on the further side of the village, then consolidated their new positions and threw a pontoon across the riv. so as to link up with the 39th Division on the S. Meanwhile the Ger. redoubt still held out. Three tanks (so far these engines of war had not been an unqualified success) were brought up, but their performance was eloquent alike of their weakness and of their value at this early stage of their development. Two were t or became bogged in the mud; a ird lumbered across to the enemy line d so frightened the garrison of the loubt that it promptly surrendered. these two attacks of the 31st and the Naval Division some 3500 soners were taken; 1500 more e captured in a brilliant attack the 51st Highland Territorial ision operating on the left of the al Division. The strongly-organ- and important village of Beau- t Hamel was taken and a great of machine-guns was made. e the action of Beaumont Hamel was being fought, the remaini divisions, S. of the Ancre, of Goug Fifth Army, also advanced, a made a little headway in the dire tion of Grandcourt and Petit Mira mont; but heavy losses were suffere by the 14th Brigade at a positio called the Munich line during ver severe fighting by the 32nd Divisio to fill up the gap between Gen Gough's right and Gen. Rawlinson's left (Fourth Army). A further advance was planned for Nov. 17, but was delayed by weather, the morass-like condition of the trenches, and the tremendous sustained Ger. barrage fire. Two companies of the 2nd Manchesters lost half their numbers on that day. At dawn on the 18th, though bomb supplies were lacking, the new advance was begun, the 15th Highland Light Infantry, the King's Own Yorkshire Light Infantry and the residue of the Manchesters gaining some ground, much of which was lost by a prompt counter-attack. It was the same tale all along the front—the shortage of bombs had rendered useless such gains of ground as were made. The advanced sections were simply bombed to pieces where they stood—object lessons in stoical discipline. This battle was the last combined operation of 1916 and is usually claimed as a British victory. It was in the same sense that the Battle of the Somme or the Battle of Arras were victories—all part of the long and extensive process of attrition.

Ancre, Baron de Lussigny (assassinated 1617), by birth a Florentine, was an attendant of Maria de Medici, wife of Henry IV. He married Leonore Saligai, one of the queen's women, and with the co-operation of his wife succeeded in aggravating the unhappy relations between Henry IV. and Maria. Upon the king's death he became marshal of France, possessing, extraordinarily enough, no military knowledge or experience. His prodigality was as lavish as it was childish.

Ancren Riwle is the title of a prose treatise written in Middle-Eng. It dates probably about the early part of the thirteenth century. It was designed specially for a small body of religious zealots consisting of three women and their servants. They occupied Tarrant House at a place called Tarrant Crawford in Dorset. The religious house of Tarrant was founded by Ralph de Kahaines. While the doctrines believed and the observances followed were quite independent of any existing creed, yet later, in 1266, evidence shows that the inmates had joined the

Cistercian order. Of the A. R. there are seven existing MSS. and one Lat. The authorship is attributed to one Richard Poor, associated with the endowment of the monastery. Its theme is the need for rigorous renunciation, though the severity of its tone is softened somewhat by the solicitous phrasing. It also contains an interesting account of the early Eng. church doctrines.

Ancrum, a vil. on the Alne water, a trib. of the Teviot in Roxburghshire in Scotland. Its name is derived from *crom*, a bend, as it is situated on a bend of the Alne. It possesses many historical associations, and is famous for the battle of A. between the English and Scotch in 1545, when the English were defeated.

Ancus Marcius (640–616 B.C.), a legendary king of Rome, who in spite of peaceful inclinations was forced to war with the Latins, whom he conquered. He founded the Port of Ostra and estab. salt works and erected prisons. (Livy, i. 32, 35; Dionysius, iii. 36–45.)

Ancyloceras (Gk. ἀγκύλος, crooked, κέρας, horn), a fossil genus of D'Orbigny found in the Cretaceous system. It is a mollusc of the order Ammonoidea and family Ancyloceratidæ.

Ancylus (Gk. ἀγκύλος, bent), a genus of fresh-water snails, often called river-limpets. They belong to the family Limnæidæ and order Euthyneura of the gastropod molluscs. Their lung-sacs always contain water, and they cannot breathe on land. They are found in springs and streams, adhering to stones and leaves.

Ancyra, an anct. city of Galatia on a trib. of the Sangarius. It was once a centre of the Tectosages, one of three Gaulish tribes who settled in Galatia in 232 B.C. An important ecclesiastical synod was convened there in A.D. 314.

Andagoya, Pascual de (1495–1548), Sp. administrator and traveller, and founder of the city of Buenaventura. The Hakluyt Society pub. in 1865 a translation of his own story of his travels.

Andalusia, formerly a prov. of Spain, but divided since 1833 into eight provs., Almena, Cadiz, Cordova, Granada, Jaen, Huelva, Malaga, and Seville. A. is a great plain enclosed by mountains except on the S.W. Parts of it are sterile, but the majority of it is very fertile. Its chief riv. is the Guadalquivir, which flows in a south-westerly direction to the Gulf of Cadiz. It has great natural riches. Some of its products are world famous, *e.g.* its sherry, and the copper mines of Rio Tinto. Many of its products are those of an Oriental climate, *e.g.* the cactus plant, the orange, and the sugar-cane. Agriculture is rather backward and certainly primitive. Its chief tns. are Seville, Malaga, Granada, and Cordova. It has passed through the hands of Carthaginian, Roman, Gothic, and Moorish conquerors, and all have left their mark on the prov. Its architecture is famous; its people lively, quick-witted, and of mixed race; its language dialectic and obviously influenced by the Moorish conquest. Area about 33,700 sq. m. Pop. 4,000,000. *See* A. de Gasparin, *Andalousie*, etc., 1886.

Andalusite (from *Andalusia* in Spain), an anhydrous silicate of alumina found in France, Spain, and N. America. It occurs crystallised in the orthorhombic system, usually in square prisms. In colour it is flesh-red to brownish, greyish-red and violet.

Andaman Islands, a group of is. in the Bay of Bengal. They number 204 and vary in size. The main portion consists of five large is. so closely connected that they are called 'Great A.' Their names in order from N. to S. are, N. A., Middle A., S. A., Baratang, and Rutland Isle. The four straits separating them are Austin Strait, Homfray's Strait, Middle Strait, and Macpherson Strait. The Little A. group on the S. was a convict settlement, which has had a deleterious effect upon the natives morally. The British settled there in 1789, in the North A. Is., but abandoned the place for Penang. The cap. of the present settlement is Port Blair in S. A. Its harbour is one of the finest in the world. The climate is warm, tempered by pleasant sea breezes, and the modifying influence of the sea. Pop. 15,000.

Andante (It. *andare*, to go), in music, is one of the five prin. tempos, and is the medium between *adagio* and *andantino*. It indicates a steady calm movement, and strict equality in the measure of each bar. It is often modified, as *A. maestoso*, slow and majestically; *A. cantabile*, slow, in a singing style; *A. ma non troppo*, slow, but not too slow.

Andantino (It., dimin. of *andante*), in music, a movement a little faster but less animated than *andante*.

Andaqui, formerly an important confederacy of Indian tribes occupying the head-waters of the Caqueta and Magdalena rivs. in S. Colombia. During a period previous to the Sp. conquest they enjoyed a high state of civilisation, evidence of which is afforded by various remains of temples and other buildings. A warlike fragment still occupies the head of the Fragua R.

Andelys, Les, a tn., consisting of two parts, Petit-Andely and Grand-

Andely, in Eure, France. It contains a very anct. Gothic church, and the ruins of Château Gaillard, built by Richard Cœur de Lion in 1198; and was the bp. of Henri and Roger Trouvères, Adrien Turnèbe, Blanchard, Brunel, and the painter Poussin. It trades in cattle, grain, leather and silk goods. Pop. 5237.

Andenne, a tn. in Belgium, 12 m. E. of Namur. Its manufs. include paper, porcelain, and tobacco-pipes (an industry dependent upon a bed of pipe-clay). A. was one of the Belgian tns. whose inhabitants especially suffered at the hands of the invading Gers. in the 1914 invasion. It is particularly mentioned with other places in Cardinal Mercier's famous pastoral letter. In a proclamation dated August 22, 1914, General von Bülow, in an attempt to condone the outrages committed, alleged that the inhabitants of the tn. made an attack on the Gers. after manifesting peaceful intentions. Hence he assented to the proposal to burn the tn. and shoot 100 of the citizens by way of warning to the people of Liège. Some 400 civilians were killed and a still larger number deported. Pop. 7256.

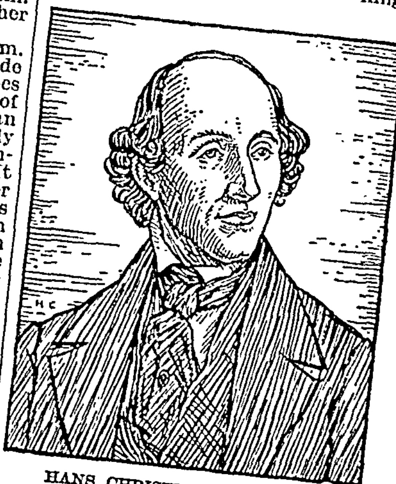
Anderab, or Inderab, a tn. of Afghanistan, on the Hindu Kush mts. in a fertile dist.; pop. 6500.

Anderlues, tn., Hainault, Belgium, 7½ m. W. of Charleroi. Coal mines. Pop. 10,844.

Andermatt, otherwise Urserna, a Swiss vil. in the canton of Uri. It is situated 18 m. S. of Lake Lucerne, and is a noted tourist centre, as it lies at the junction of the Furka Pass with the St. Gothard road. Elevation 4000 ft.

Andernach, a tn. on the Rhine belonging to the dist. of Coblenz. It was once a Rom. fortress and bore the name of Antunnacum. Later it became a residence of the Merovingian kings. The tn. has an atmosphere of mediævalism. Its industries are the manuf. of millstones and cement. Pop. 10,770.

Andersen, Hans Christian (1805–75), a most popular Dan. writer, and one of the greatest children's story-tellers of the world. He was *b.* at Odense in Fünen. His father was a shoemaker, but his son's musical talents and generally superior abilities won recognition of influential friends. In his young days he displayed considerable poetic promise, and made an endeavour to enter the theatre at Copenhagen. His lack of education, however, barred his entrance. Moreover it was physically impossible for him to develop his vocal ability. At the instance of the king he was educated, and presently made a success with a poem called *The Dying Child*, which was followed by a literary satire called *A Walk to Amak*. A verse criticism met him, but eventually triumphed after travelling abroad, again at the king's



HANS CHRISTIAN ANDERSEN

expense. His works, the best of which are proverbially known as *Hans Andersen's Fairy Tales*, include: *Picture-books without Pictures*, *A Poet's Bazaar*, *Tales from Jutland*, *The Wild Swan*, and *The Ice Maiden*. His *Ugly Duckling* and *The Brave Tin Soldier* are known and loved by children the world over.

Anderson: (1) Co. seat of Madison co., Indiana, U.S.A. Manufs. glass, crockery, and tiles. Pop. 39,788. (2) Co. seat of A. co., S. Carolina, U.S.A., 100 m. N.W. of Columbia; has cotton-seed oil mills, lumber and flour mills, and machine shops. Pop. 10,570.

Anderson, Adam (1692–1765), a Scottish economist. For forty years he served as a clerk in the S. Sea House, where he pub. *Historical and Chronological Deduction of the Origin of Commerce from Earliest Accounts to Present Times* in 1762.

Anderson, Alexander (1582–1620), a Scottish mathematician; *b.* at Aberdeen; he taught as a youth at Paris. He ed. the works of Franciscus Vieta.

Anderson, Alexander (1845–1909), a Scottish poet. His productions include: *Songs of Labour, Two Angels, Songs of the Rail, Ballads and Sonnets.*

Anderson, Christopher (1782–1852), a theological writer and preacher. He estab. the Edinburgh Bible Society.

a

f work is *Annals of the Bible.*

son, Sir Edmund (1530–1605), lawyer. He was appointed -at-law to Queen Elizabeth , and was the author of *Re- Many Principal Cases Argued judged in the Time of Queen h in the Common Bench.*

rson, Elizabeth (Garrett) (1836– doctor of medicine. She was oneer of the movement to in- women in the medical pro- . After a severe struggle she t was admitted to the Society pothecaries, London. In 1866 vas appointed general medical dant at St. Mary's Dispensary, nstitution for women medical onts. It became the New Hos- l later; she officiated there nty years. She obtained her ree of M.D. from the Univ. of is, 1870. In London she took t in public life, working on the ool board. She married in 1871 . J. G. S. Anderson, a ship-owner, o d. in 1907. In 1908 she was ected mayor of Aldeburgh, her tive tn., being the first woman ayor ever elected in England.

Anderson, Sir George William 1791–1857), Indian civil servant and dministrator, was the son of a Lon- lon merchant. After distinguishing himself in the Indian judicial service he acted as temporary governor of Bombay, 1841–2, and in 1849 was appointed governor of Mauritius, where, during a short term of office, he carried out sev. important reforms. From 1850 to 1855 he was governor of Ceylon, where he also distinguished himself by various important im- provements in judicial procedure.

Anderson, James (1662–1728), a Scottish genealogist and antiquary, *b.* at Edinburgh; he worked during his life upon the publication of *Records of Scottish Parliaments* just before the union. Pecuniary losses resulted and he was appointed postmaster-general as a recompense. His other works include *An Historical Essay showing that the Crown and Kingdom of Scot- land is Imperial and Independent.*

Anderson, James (1739–1808), Scot- tish agriculturist and economist, *b.* near Edinburgh at Hermiston. He produced a weekly paper called *The Bee*, which was followed by *Recrea- tions in Agriculture, Natural History, Art, and Miscellaneous Literature,* also a periodical.

Anderson, John (1726–96), Scottish natural philosopher, *b.* in Dumbarton- shire. He founded Anderson College, Glasgow. In 1756 he became profes- sor of Oriental languages in Glasgow University, and four years later professor of natural philosophy. He was interested chiefly in the appli- cation of science to industry. He *d.* in Glasgow, and produced *Institutes of Physics*, which went through five eds. in ten years.

Anderson, Joseph (1832), Scottish antiquary, and since 1870 keeper of the National Museum of Antiquities in Edinburgh, was *b.* and educated at Arbroath. He has ed. various works, including the *Orkneyinga Saga*, 1873, and Drummond's *Ancient Scottish Weapons*, 1881, and has pub. numerous papers in the *Proceedings of the Society of Antiquaries of Scotland*, of which he was Rhind lecturer, 1879–82 and 1892.

Anderson, Mary (*b.* 1859), an Ameri- can actress of great beauty, *b.* in California. Her father was an officer in the Confederate service during the civil war. He died in 1863. His daughter was educated at Roman Catholic institutions till she was thir- teen, when she studied for the stage upon the advice of Charlotte Cush- man. In 1875 she played Juliet for the first time, and met with great success. In 1889 she retired and married Antonio de Navarro.

Anderson, Richard Henry (1821– 79), American soldier, born in S. Carolina; graduated at West Point, and served in the Mexican War. At the outbreak of the civil war he resigned his commission and joined the Confederate army as brigadier- general. He won distinction at Gettysburg and Chancellorsville and Spottsylvania.

Anderson, Robert (1770–1833), Cum- brian poet, was a native of Carlisle. His first volume of poems was pub. in 1798, and was followed in 1801 by the popular ballad *Betty Brown*. His best-known work, the collection of ballads in the Cumbrian dialect, appeared four years later. Amongst the best of his dialect poems are: *The Impatient Lass, King Roger, Will and Kate, The Bashfu' Wooer,* and *Jenny's Complaint*. Towards the end of his life Anderson gave way to intem- perance and suffered great poverty. His *Works* were pub. at Carlisle in 1820. *See also* Gilpin's *Songs and Ballads of Cumberland*, 1874.

Anderson, Sir Robert (1841–1921), criminologist and writer, was *b.* at Dublin and educated at Trinity Col- lege. In 1868 he was appointed Home Office adviser in matters re- lating to political crime, and later became assistant commissioner of police of the metropolis. He was head of the Criminal Investigation Dept. from 1888 to 1901. In 1910 he caused a sensation by confessing the authorship of the famous *Times* letters of 1887 entitled 'Parnellism and Crime.' He is well known f

his writings in defence of orthodox religion, among which may be mentioned: *The Bible and Modern Criticism*, 1902; *In Defence; a Plea for the Faith*, 1907; and *The Bible or the Church?* 1908. He was also the author of *Sidelights on the Home Rule Movement*, 1906; *Criminals and Crime*, 1907; and *The Lighter Side of my Official Life*, 1910.

Anderson, William (1842–1900), surgeon and orientalist, was from 1873 to 1880 professor of anatomy and surgery at the Japanese Naval and Medical College at Tokio. In 1874 he became medical officer to the British Legation at Tokio. In the spare time left over from his medical duties he made a close study of the pictorial arts of China and Japan, and formed a fine collection of Chinese and Japanese paintings, now in the British Museum. In addition to various important medical and other contributions to the Press, he wrote a *Treatise on the Pictorial Arts of Japan*, 1886; *Japanese Wood Engraving*, 1895; and a descriptive and historical catalogue of the collection of Japanese and Chinese pictures in the British Museum, 1886.

Andersonian Institution, *see* ANDERSON'S COLLEGE.

Anderson's College, Glasgow, was founded by John Anderson, 1795, and endowed by him with a library, museum, and philosophical apparatus. The object of the founder was to give instructions, free of expense, in natural philosophy. Geography, mathematics, Latin, Gk., Hebrew, and Fr. were afterwards taught, but it is now chiefly engaged in the teaching of medicine, physics, chemistry, and botany. In 1886 the non-medical sections were incorporated with other institutions as the Glasgow and West of Scotland Technical College.

Andersonville, a vil. of Sumter, Georgia, noted as having been the seat of a Confederate States military prison, where Union prisoners were confined during the Civil War. This prison was kept in so scandalous a condition that those incarcerated in it died by thousands. Pop. 231.

Anderson, Karl Johan (1827–67), Swedish explorer, made sev. important expeditions in S. Africa, which he has described in *Lake Ngami, or Discoveries in S. Africa*, 1856; *The Okavango River*, 1861; and *Notes of Travel in S. Africa*, 1875.

Andes, a great mt. system in one long continuous chain lying along the W. coast of S. America. Its length is approximately 4400 m., and it extends from the Isthmus of Panama to Cape Horn. The width of the system varies considerably, but its widest point has a breadth of 100 m. Necessarily the altitude is not easily [...] but roughly the average height [...] chain is 13,000 ft. It is the gr[...] mt. system in the world. A th[...] that gains in evidence as time [...]gresses is that the A. are conn[...] with the Rocky Mts. of N. Ame[...] The whole system may be div[...] into two almost parallel ch[...] separated by a declivity in wh[...] lesser mt. ranges rise. In differ[...] localities the names undergo chang[...] Generally, however, the E. ran[...] is known as the A., but in Pe[...] Colombia, and Bolivia it is call[...] Cordillera Real de los Andes. In A[...]gentina the E. system merges in[...] the W. div., and both ranges no[...] bear together the name of Cordiller[...] de la Costa. The W. section, i[...] Colombia, Peru, and Bolivia, i[...] called La Cordillera, while below lat[...] 23° S. it becomes the Cordillera de[...] los Andes. The southernmost extremity is Cape Horn, and here the range extends into the sea and actually forms is. bearing the name of Diego Ramirez. The great Chonos Archipelago owes its formation to a similar cause, and many authorities aver that it is the is. that constitute the principal part of the range. In Patagonia the system is interrupted to some considerable degree by glaciers and deeply-cut fiords. The highest peaks are Tolima (18,300 ft.) in Colombia; Cayambe (19,155 ft.), Antisana (19,335 ft.), Cotopaxi (19,600 ft.), and Chimborazo (20,500 ft.), in Ecuador; Knot of Pasco and Misti in Peru; Illampu (21,500 ft.), Illimani (21,221 ft.), and Sahama (21,000 ft.) in Bolivia; Llullaillaco (20,243 ft.) and Copiapo (19,685 ft.) to the S. of Atacama Desert; Aconcagua (23,000 ft.), the highest peak in the whole range, and Cima de Mercedario, in Chile.

The whole region is volcanic and possesses many active volcanoes, the chief of which is Cotopaxi, in Ecuador, the flames from the crater of Cotopaxi attaining the extraordinary height sometimes of over 3000 ft. above the crater. Of course the ages of the different portions vary, but the main characteristic of their composition is the volcanic element. In tracing the world's 'ring' of volcanoes, the A. form a link of special significance owing to the abundance of volcanic results and present-day activity. In Tierra del Fuego the Cordillera is composed of crystalline schists, the extremity of which portion are Mts. Darwin and Sarmiento. The A. abound in plateaux, as may well be expected, the most important regarding elevation of which are Assuay (14,500 ft.), Colloa (12,500 ft.), Cruz Verde (11,695

), Pasco (11,000 ft.), Quito (9500 .), and Bogota (8958 ft.). The ineral wealth of the A. is fabulous, nd the chief metals for which it is amous are gold, silver, platinum, nercury, copper, lead, tin, and iron. Of gold and silver particularly, the A. hold vast stores. The climate in the Andean region is rendered very dry by the effect of the mts. in cutting off the rain-bearing winds. From the A. eastwards, however, a heavy and beneficial rainy season owes its fall to the position of the A., as they lie directly across the trade winds. The great water-courses of the Amazon, Orinoco, and Plata owe their birth to the E. terraces of the A. The tremendous scale upon which all phenomena are created in this vast mt. system forms one of the chief attractions to visitors and tourists, who never fail to be impressed by the hugeness of their masses and the immensity of the cañons. (E. A. Fitzgerald, *Highest Andes*, 1899.)

Andesite, a name given originally to a group of lavas found in the Andes, but now applied to a large number of igneous rocks found in volcanic areas throughout the world and belonging to all geological epochs. They show considerable differences in composition, but usually consist of a ground-mass of felspar crystals, in which other minerals, such as biotite, hornblende, augite, and hypersthene, often occur. They are common in the Andes and Cordilleras of S., Central, and N. America.

Andira, a genus of tropical Leguminosæ. *A. inermis*, the cabbage tree, is a species found in the W. Indies; its bark is a strong anthelmintic.

Andirons, generally known as 'fire-dogs.' They consist of a horizontal bar on supports, on which rest poker, tongs, etc.

Andkhui, a tn. in Afghan-Turkestan, due W. of Balkh, on the edge of the desert. Its site is extremely unhealthy, and the pop. consists mainly of Turkomans, Uzbegs, and a few Tajiks. Pop. 15,000.

Andocides (439–389 B.C.), one of the celebrated Attic orators. He was concerned in the mutilation of the Hermæ in 415, but in order to save himself he turned informer, in spite of which he had to forfeit many civil rights, and was condemned to exile. Banished from his native land, he followed a commercial occupation. On the democratic restoration he returned to Athens, and recovering favour, was appointed to several high places. In 391 he was sent as an ambas. to Sparta to negotiate for peace. His failure led to complete downfall. Owing to his inability to adapt himself to persons likely to assist him he soon made his position intolerable.

Andorra, a small republican state on the Franco-Spanish border. It forms one large valley, being entirely surrounded by mts., a physical circumstance which has made independence easy to maintain and communication with the outside world difficult of establishment. The climate is cold and the winters are severe. Most of the land is used for the purposes of pasturage, with the exception of the S., whose fertile slopes afford scope for cultivation. The chief products are grain, fruit, potatoes, tobacco, dairy produce, and wool. The surrounding mts. contain quantities of iron and lead, but the industries that might develop are hampered by a lack of fuel. Nor has the country any financial capital. In religion all the Andorrans are Roman Catholics. The region comprises the six dists. of A.-Vicilla, Canillo, Encamp, La Massana, Ordino, and San Julian de Loria. In the administration there are appointed by each parish two consuls. These form the council general. The cap. of the state is A.-Vicilla. A. traces its independence back to Charlemagne. At the present day A. is under the joint suzerainty of France and the Bishop of Urgel. Each appoints a 'vicar,' *i.e.* a judge. A permanent official represents Fr. interests. The general character of the Andorrans is good-natured and moral. Area 175 sq. m. Pop. 5231.

Andover, a mrkt. tn. of Hampshire, England. It is situated on the R. Anton, a trib. of the Test. The centre of an extensive agric. dist. it owes its importance to its agric. products. It contains many very well-preserved Rom. remains. Its former industries of silk, iron, and parchment are now extinct. Pop. 7596.

Andover, a tn. of Essex co. in Massachusetts, U.S.A., on the S.E. side of Merrimac Valley, the most important centre in the world for mil It is noted for the manuf. of twin woollens, and rubber goods, and f its educational institutions, Phill Academy, Abbot Academy, and t Theological Seminary founded 1808 and removed to Cambrid Mass., in 1908. The instruction originally Calvinistic, but it is ope all Protestant denominations. H riet Beecher Stowe resided, an buried, at A. Pop. 9969.

Andrada e Sylva, Bonifacio de (1763–1838), Brazilian scie author, and statesman, and one o founders of Brazilian independ Studied in Europe, and subsequ in virtue of his distinguished sci attainments, was appointed pro of geology and metallurgy a

university of Coimbra, Portugal. He became inspector-general of mines under the Portuguese gov., and was placed in charge of various important public works. He returned to Brazil in 1819, took up the cause of independence, and in 1822 became minister to the interior under Dom Pedro I. He was banished in 1823 on account of his democratic opinions, but on the abdication of Dom Pedro was entrusted with the education of the prince imperial. In addition to important scientific memoirs he wrote *Poesias d' America Elysea*, Bordeaux, 1825.

Andral, Gabriel (1797–1876), eminent Fr. physician, was *b.* in Paris. He occupied the chairs of hygiene and pathology in turn, and in 1839 succeeded Broussais as professor of pathology and therapeutics in the university of Paris. His chief works were *Clinique médicale*, 1824, and *Précis élémentaire d'anatomie pathologique*, 1829.

Andrassy, Count Julius (1823–90), Hungarian statesman, *b.* in Kassa in Hungary. He soon plunged into political controversy. In 1846 his bitter writings attracted notice. In 1848 he was returned as a Radical member of the Diet. In the Hungarian revolt he took part, and an effigy of him was hanged in Austria. In 1867 he was made the first Hungarian premier, and later succeeded Bench as chancellor. Here he adranced radical changes, and under is influence Austria resumed her osition of prominence in Europe. is policy of occupying Bosnia and erzegovina was very unpopular, d he was compelled to retire from e public arena.

Andrassy, Count Julius, *b.* 1862, ungarian statesman, son of the ove. For a long time a leading ember of the Hungarian Diet and pillar of the old Liberal Party, ether with Count Apponyi. During the difficult times of 1917 he ceeded Count Tisza as a Magyar tructionist to constitutional rens (*see* AUSTRIA-HUNGARY). In ober 1918 he succeeded Count an as foreign minister, being the foreign minister under the Dual rchy. In that capacity he ed President Wilson that his was ready to acknowledge 'the s of the peoples of Austria-ary, especially those of the o-Slovaks and the Jugo-Slavs,' make a separate peace without ng the issue as between Ger- and the Allies. His *Bismarck ndrassy* is a commentary on psburgs and the causes of the e of that monarchy.

é, or Andreas, Bernard (*c.* 1500), historian and poet, was a native of Toulouse, and an Augustinian friar. He is supposed to have come to England with Henry VII., who made him poet laureate and royal historiographer. He secured various eccles. appointments and became tutor to Arthur, Prince of Wales. He wrote in Latin a valuable history of Henry's reign, under the title *Historia Regis Henrici Septimi*.

Andre, John (1751–82), *b.* in London, and was adjutant-general to the Eng. forces during the American War of Independence. He was appointed in 1780 to carry on negotiations with the American general, Arnold (*q.v.*), who offered to betray his command at W. Point. Major Andre, when returning from an interview in disguise, was captured by the rebels and sent to General Washington, who after a trial had him hanged at Tappan as a spy. His remains were brought to England in 1821, and a monument is erected to his memory in Westminster Abbey.

André, Louis J. N. (1838–1913), Fr. general, served through the siege of Paris, was appointed head of the military Ecole Polytechnique in 1893, and became minister of war in the Waldeck-Rousseau administration in 1900. He remained in office under the Combes ministry, 1902, but resigned in 1904 after violent scenes arising out of a system of espionage over officers suspected of anti-republican tendencies.

Andrea, Johann Valentin (1586–1654), a Ger. author, *b.* near Tübingen, where he studied for the church. He was long thought to be the founder of the Rosicrucian order, an opinion largely brought about by three books which were supposed to be an account of an existent secret society practising strange symbolical rites. He only acknowledged one of these, and in all probabilty they were written as satires.

Andrea del Sarto (1488–1530), a Florentine painter. He was the son of a tailor, hence his surname (of a tailor), and most of his early training was obtained by studying the works of the great masters like Michael Angelo and Leonardo da Vinci and the engravings of Dürer. In 1518 he went to France at the inducement of Francis I., but was guilty, through the extravagance of his wife, of appropriating certain sums intrusted to him by his royal patron for the purchase of works of art. His chief pictures include 'The Sacrifice of Abraham,' 'A Burial,' 'The Dead Saviour with Mary and the Saints,' 'The History of Joseph,' 'The Madonna del Sacco,' and sev. holy families. He also copied sev. of the

old masters, attaining in this style of work a very high standard. It is said that at the taking of Florence in 1529 the soldiers were so awe-struck by his picture of 'The Last Supper' that they left the house without committing any violence. He *d.* of plague. Browning wrote a poem, 'Andrea del Sarto,' in his *Men and Women*.

Andrea Vanucci, *see* ANDREA DEL SARTO.

Andreæ, Laurentius (1480–1552), Swedish pioneer of Protestantism, studied at Rome, but returned with Protestant convictions, and as archdeacon of his native place, Strengnäs, brought Eustavus I. over to the side of the reformed religion. The king appointed him to superintend the translation of the Bible. He subsequently fell into disgrace, and was sentenced to death for conspiracy, but was ultimately reprieved with a heavy fine.

Andreas, an A.-S. poem, in which are described the adventures of St. Andrew in rescuing St. Matthew from prison in Mermedonia. It has been attributed to Cynewulf. Some of the sea passages, such as the description of the stormy voyage, are particularly fine.

Andreasberg, a tn. in Hanover, Germany, 14 m. from Klausthal. It is noted for its mines, yielding silver, lead, copper, iron, cobalt, and arsenic. Pop. 3700.

Andree, Saloman August (1854–97), a Swedish engineer and explorer. In July, 1897, he attempted to reach the North Pole by balloon with two companions, Strindberg and Fraenkel. This hazardous journey was attempted in the days before the introduction of aircraft of any sort other than the drifting balloon, and before the advent of radiotelegraphy. A.'s balloon was one of 5000 cubic metres capacity, and a start was made from Dane's Is., Spitzbergen, on July 11. A.'s only means of communication with the outer world was by buoys dropped overboard and by carrier-pigeons. Several of the former were subsequently found, and a pigeon, bearing a dispatch dated July 13, returned home. Thereafter nothing further was known of the intrepid party until the summer of 1930. In that year two Norwegian vessels engaged in scientific survey work came upon the bodies of the explorers on White Island, between Spitzbergen and Franz Josef Land. This discovery was only rendered possible by an exceptional melting of the snow and ice covering A.'s last camp. Among the finds were logs and diaries which showed that the balloon had remained in the air for three days and that death had overtaken the party, after travelling on foot over the ice, or drifting on the floes, in Oct., 1897. The bodies were brought home to Sweden, with the impedimenta of the expedition, and the contents of the diaries and logs published. According to these the ice fringe was reached on the first day, the drift being at first northerly and N.W., then easterly. 82° N. was reached at about midnight of the first day. The balloon then remained stationary for some hours, then moved westerly and then S. The next day, the 14th, during the afternoon and evening the balloon was again moving in a different direction, easterly or N.E., but all the time losing height. The balloon finally landed at 83° 4′ N. latitude, and was abandoned. The death of the party, after a passage over the ice to a spot many scores of miles to the S., was not due to hunger, for food was found next the bodies.

Andréossi, Comte d', Antoine François (1761–1828), a Fr. general and statesman, *b.* at Castelnaudary. He served under Napoleon in Egypt, and was afterwards ambassador at London, Vienna, and Constantinople. His writings include the *Histoire Générale du Canal du Midi*, as well as scientific and military works.

Andrew, the name of three Hungarian kings, A. I. reigned 1046–58, and was dethroned by his brother. A. II. reigned 1205–36, and in 1217 conducted a crusade to Jerusalem, while A. III. came to the throne in 1290, and reigned till 1301, after opposition from the pope, who wanted to keep the country in his own power, but the king defeated the army of the church and held the crown

Andrew, John Albion (1818–67), was an American statesman. He was a lawyer of Boston, and was noted for his anti-slavery principles. He was governor of Massachusetts in the Republican interest, and during the civil war between N. and S. was a prominent speaker and advocate for the negroes and the interests of the soldiers engaged in the contest.

Andrew, Saint, was the brother of St. Peter and the first disciple of Jesus. Both brothers were fishermen. St. A. preached in Scythia, Thrace, Asia Minor, and in Greece, and tradition tells us that he was crucified at Petræ on an X-like form of cross known as St. A.'s Cross. The Russians revere him as having brought them the gospel, and he is the patron saint of Scotland, and the supposed anniversary of his martyrdom, Nov. 30, is honoured with a feast.

The Order of St. Andrew was the highest honour in Russia, and was

founded in 1698 by Peter the Great. With a few exceptions, it was only given to those of royal blood. St. A.'s Cross was the emblem on the Russian naval flag, and it forms part of the British 'Union Jack,' where it represents Scotland, being taken from the old Scottish flag.

Andrewes, Lancelot (1555–1626), a famous Anglican bishop, who was *b.* in London. He was educated at Pembroke Hall, Cambridge, and in 1589 was made a canon of St. Paul's and master of Pembroke Hall. He was chaplain-in-ordinary to Queen Elizabeth and in favour also with James I. He was made bishop of Chichester in 1605, and translated to Ely in 1609, and made a privy councillor. He helped with the preparation of the A.V. of the Bible. He was the most learned of all Eng. theologians. In 1618 he was made bishop of Winchester, and *d.* in 1626. One of Milton's early Latin elegies bewailed the death of A. His best-known work is his *Manual of Private Devotions and Meditations for every day in the week.*

Andrews, Elisha Benjamin (1844–1917), American economist, historian, and educationalist, served in the civil war, in which he lost an eye. He was president of Denison University 1875–79, professor of homiletics at Newton Theological Institution 1879–82, professor of political economy at Brown University 1882–88, and president of the same university 1889–98. From 1900 he was chancellor of Nebraska University. At the Brussels Monetary Conference of 1892, to which he was U.S. delegate, he ardently championed the cause of international bimetallism. Amongst other works he wrote *Institutes of Economics*, 1889; *An Honest Dollar*, 1889; *Wealth and Moral Law*, 1894; *History of the United States*, 1894; *History of the Last Quarter Century in the United States*, 1896; and *The United States in our own Times*, 1904. Died at Interlaken, Florida.

Andrews, James Pettit (?1737–97), historian and antiquary, was *b.* near Newbury. After serving in the Berkshire militia, he studied law, and subsequently became a magistrate at the Queen Square Police Court, Westminster. His chief works are: *Anecdotes, Antient and Modern*, 1789; *History of Great Britain connected with the Chronology of Europe*, 1794–5; and *History of Great Britain from Death of Henry VIII. to Accession of James VI. of Scotland*, 1796. This last was a continuation of Henry's *History of Great Britain.*

Andrews, Roy Chapman. Born Beloit, Ill., Jan 26, 1884. Eminent zoologist and chief of the div. of Asiatic exploration for the American Museum of Natural History. He discovered oldest known mammals and extensive evidence of primitive human life in the Central Asian plateau. Discovered many geological strata previously unknown, including some of the richest fossil fields. He was the the first to discover fossilised dinosaur eggs, and skull and parts of the skeleton of the baluchitherium, the largest known mammal. Has proved Central Asia to be one of the chief centres of the origin and distribution of reptilian and mammalian life. Member of many American scientific societies and corresponding member Zoological Society and Central Asiatic Society of London.

Andrews, Saint, *see* SAINT ANDREWS.

Andrews, Thomas (1813–85), chemist and physicist, was a native of Belfast, where, after practising medicine for some years, in 1845 he became professor of chemistry at Queen's College. His most important scientific achievement was the discovery of the continuity of the liquid and gaseous states. His scientific papers, with a memoir, were ed. by Tait and Crum-Brown, 1889.

Andreyev, Leonid Nikolaevich (1871–1919), a Russian novelist and dramatist, *b.* Orel, of a family of the provincial intelligentsia. The poverty and misery in his life are reflected in the gloominess of his stories. He was the only writer of his generation to rival Maxim Gorky in popularity. He excelled chiefly in short stories, the style of which is Tolstoyan realism, but with something of the lighter touch of Tchehov. Among his best known short stories are *The Abyss*, and *In the Fog*. His earlier tales are sex problems treated in a bold, crude manner, the later are more artificial and told in a somewhat turgid, declamatory style. His plays which are symbolical in treatment, *e.g.* *The Life of Man* (1907), are marred by the crudities of melodrama.

Andria, a tn. in the S. It. prov. of Bari, and 30 m. N. of that tn. It has a fine cathedral founded in 1046. Majolica manufacture is carried on, and a trade in almonds. Pop. 50,620.

Andrieux, François Guillaume Jean Stanislaus (1759–1833), a Fr. author *b.* in Germany. At first he was a lawyer, but forsook that calling for literature. His comedies are distinguished by their wit and charm, among the best being *Les Etourdes* and *La Comédienne*. He also wrote many poems and romances. He was secretary of the French Academy.

Androclus, or Androcles, was the Rom. slave who, when hiding from his master in the desert, extracted a thorn

out of the foot of a lion. When he was caught he was taken to the circus as a punishment, and a lion was let loose upon him. To the astonishment of the people the animal fawned on him instead of devouring him, for it was the identical animal he had succoured in the desert. He afterwards led the lion through the streets of Rome. This story was told by Apion (*q.v.*), and is to be found in Gellius, v. 14.

Androgynous (Gk. ἀνήρ, man, γυνή, woman), a biological term synonymous with hermaphrodite. It implies in zoology that the animal, such as a leech, possesses in its one body the organs of both sexes; and in botany that the plant, such as the arum lily, has both male and female flowers on one inflorescence.

Andromache was the daughter of Eëtion, king of Thebes in Cilicia, and wife of Hector, one of the finest female characters in the *Iliad*. After the conquest of Troy she was captured by Pyrrhus, son of Achilles, by whom she had three sons, but Pyrrhus afterwards left her to Helenus, the brother of Hector. She is made the chief character in tragedies by Euripides and Racine.

Andromeda was the daughter of the Ethiopian king Cepheus and of Cassiopeia. Because of the mother's boast of her daughter's beauty surpassing that of certain goddesses, Neptune, their father, sent a terrible sea-monster to invade the kingdom of Cepheus. To appease Neptune the oracle declared that A. must be given up to the monster. From this danger she was rescued by Perseus, who beheld her chained to the rock; he slew the monster and obtained the beautiful virgin in marriage. This story forms one of Corneille's tragedies, and has given the name to a constellation. This constellation occupies a considerable region of the heavens below Cassiopeia. It is to be found by drawing a line through the brightest star (Beta) of the five in Cassiopeia ('My Lady's Chair') and the Pole star. This passes through a star of the first magnitude in the head of A., marked α, and called *Alpheratz*. Perseus is a neighbouring constellation. A. is a constellation rich in astronomical interest, and includes a remarkable nebula, a triple star, and the radiant point of a meteoric shower. The nebula is remarkable in that it is the only nebula visible to the naked eye. It was first observed through a telescope by Simon Marius on Dec. 15, 1612, who compared it to a candle shining through a horn lantern, but there seems evidence that this nebula was discovered by Al Sufi in the tenth century. Whether this be so or not, the nebula in A. is memorable for being the first discovered nebula, its great rival in Orion not being discovered till forty years later. It is spiral in shape, a fact first disclosed by a photograph by Dr. Roberts in 1888. The Andronoids, or shower of meteorites, radiating from a point in A. on Nov. 28, have been conjectured to be the fragments of the disrupted, short period, Biela's comet. Almaach, or Gamma Andromedæ, was found by Herschel to consist of two stars of magnitude 2·5 and 5·5, about 10″ distant. On examining the fainter of the two stars by a very powerful telescope Otto Struve found it to be a very close double star. Subsequent discovery revealed the fact that this pair, green and blue in colour, revolve round the primary, which is an orange-coloured or solar star.

Andromeda, a genus of plants belonging to the Ericaceæ. They are shrubs, natives of Europe, Asia, and N. America. *A. polifolia*, wild rosemary, grows in British peat bogs; *A. rosmarinifolia*, rosemary-leaved marsh A., is found in Newfoundland and Labrador.

Andronicus was the advocate of the Jews under the reign of Ptolemæus Philometor against the Samaritans in Egypt, who asserted the authority of the temple on Mt. Gerizim against the temple at Jerusalem. Ptolemæus Philometor was appealed to, and in court Sabbai (Sabbæus) and Theodosius, the Samaritan advocates, lost their cause against A., and were put to death.

Andronicus (*c.* 1100), the first Comnenus, an emperor of Byzantium. He killed Alexius II. and seized the throne, but in 1185 he was himself assassinated.

Andronicus Cyrrhestes (*c.* 100 B.C.), a Gk. architect, who was famous for having constructed the Tower of the Winds at Athens. It takes its name from the figures of the eight winds being cut in relief on the exterior wall of the building. The tower was intended for a sun-dial, and it also contained a water-clock.

Andronicus Livius, the earliest Rom. poet, was really a Gk., and formerly a slave to M. Livius Salinator, who freed him and gave him the name of Livius. He wrote both tragedies and comedies, and his first drama was acted in 240 B.C. He also trans. Homer's *Odyssey* into Saturnian verse.

Andronicus Palæologus, the elder and the younger, emperors of Byzantium, the former reigned from 1283 to 1328 and the younger 1328–41. Both reigns were noted for the wars with the Turks, who, in the latter, conquered all the Asiatic ter. of the

empire. *See* Gibbon's *Decline and Fall; The Byzantine Historians.*

Andronicus Rhodius (c. 58 B.C.), a Rom. philosopher. He is chiefly known through his exposition of the teachings of Aristotle.

Andronicus, Titus, name of an Elizabethan drama, the authorship of which is the subject of much controversy, but which is generally attributed to Shakespeare. It is usually included in his complete works, and it is probable that he had a hand in its composition.

Andropogon is a genus of Gramineæ of which sev. species are well known. *A. Schœnanthus*, the Indian Rusa grass, yields the aromatic Rusa oil, *A. nardus* citronella oil, and *A. sorghum* a kind of millet seed from which a flour, called durra in India and Arabia, is made.

Andros, an is. of the Grecian Archipelago, situated to the S.E. of Eubœa. It is 21 m. long, 8 m. broad. It is mountainous, and the soil is fertile, producing grapes, oranges, citrons, and lemons. The manufs. consist of wine and silk. The most important tn. is A., or Castro, situated on the E. coast. Pop. of island 16,895.

Andros Island, one of the Bahamas group, has a length of 100 m., and varies in breadth from 10 to 40 m. It is low and swampy, but well timbered, and exports sponges and wool. Pop. 6976.

Andros, Sir Edmund (1637-1714). From 1674 to 1681 he was governor of New York, and afterwards of New England. In 1689 he was tried in England for attempting to seize the charter of Connecticut, but acquitted and appointed governor of Virginia in 1692, which post he held for six years.

Androscoffin, a riv. of Maine, in America, which rises in the White Mts. and which subsequently joins the Kennebec after a course of 155 m.

Androsphinx, a sphinx with the head of a man, not a woman, as is usually the case. An example is the A. of Thothmes III. in the Boulak Museum, Cairo.

Andujar, a Sp. tn. in the dist. f Andalusia in the prov. of Jaën, ituated on the R. Guadalquivir. he chief manuf. carried on is porous oling water-jars. In 1808 the nvention of Bayleu was signed re. Pop. 17,950.

Anduze, a tn. in Gard, France, on e Gardon d'Anduz. It is an ill-lt place, but is situated amongst utiful scenery, and is noted for its ket and paper making, and for its teries. Pop. 2589.

ndyan, a tn. of Russian Turkestan he prov. of Ferghana. It is the terminus of the Trans-Caspian way. It is the centre of the raw cotton trade. In 1902 a devastat earthquake destroyed the tn., si when it has been reconstruct Pop. 49,682.

Anecdote (Gk. ἀνέκδοτος, not pu lished) is a narrative of a particu fact or incident often little known, b nevertheless interesting; and affor ing a side-light on the true characte of a person, or of the characteristi of a certain age. Formerly the ter was applied to private or hithert unpublished memoirs or narratives Muratori and Mersenne gave the name of 'A.' to unknown works which they ed. Procopius wrote an anecdotical history of the Emperor Justinian and his wife Theodora, and As. were common among the Gk. and Lat. writers.

Anegada, *see* ANTILLES.

Anelectrotonus, the decreased excitability in the neighbourhood of the anode in a nerve through which an electric current is passing. The part of the nerve near the positive pole needs a stronger stimulus than under normal conditions to display functional activity, whilst near the negative pole the excitability of the nerve is increased. The latter condition is called *kathelectrotonus*.

Anemochord, a kind of pianoforte invented by Schnell in 1789, in which the notes were produced by currents of compressed air directed on the strings. On this instrument the music had a peculiar effect of distance.

Anemometer, an instrument for measuring the velocity of the wind. In the Robinson or cup A. four hemispherical cups are fixed on four arms at right angles so that their concave surfaces are in the same direction of rotation. The motion imparted by the wind is translated by a series of cog-wheels so as to indicate miles per hour. The Dines or tube A. consists of two tubes, one of which has an open mouth kept facing the wind by a vane as in a weathercock. The increased pressure is communicated down the tube to a recording apparatus. The other tube is perforated by small holes arranged in rings so that suction, or a decrease in pressure, is produced by the wind passing across the holes. The decrease in pressure is also communicated to the recording apparatus, which consists of a float in a closed vessel, so arranged that when the wind is blowing the increased pressure in the first tube is applied underneath the float, raising it in the water, and the decreased pressure is communicated to the air above the float, also tending to raise it. The movements of the float are registered graphically on a slowly revolving drum.

Anemone, a genus of Ranunculaceæ, includes sev. well-known and

beautiful flowers which possess the property of extreme acridity. *A. pulsatilla*, the Pasque flower, and *A. pratensis* are powerful emetics; the leaves of the former will raise blisters on the skin. *A. nemorosa* is the wood-anemone or 'wind-star,' *A. Hepatica*, the hepatica, and *A. coronaria* the common garden anemone.

Anemone, Sea, is a name given to the polyps which do not form coral, the Actinaria, of the order Zoantharia, because their spread-out tentacles give them a resemblance of the flower A. They are found attached to rocks and the shells of hermit crabs; a few can swim freely; they feed on small animal life. *See* P. H. Gosse's *History of the British Sea-Anemones and Corals*, 1860.

Anemoscope, an instrument for determining the direction of the wind. It is usually constructed by connecting with the spindle of a weathercock the hand of a dial on which the points of the compass are marked. The electrical A. of A. Lucchesi, by means of a galvanometer, gives the eight principal directions of the wind.

Anenchelum, a fossil genus of fishes of family Trichiuridæ and order Physoclysti, found in the black slates of Engi.



ANEROID

Aneroid, a term applied to a barometer in which the pressure of the air is measured without the use of mercury or other liquid. It consists essentially of a hollow box of elastic metal in which there is rarefied air. Any external pressure causes a proportionate amount of compression of this box, which is conveyed through a multiplying arrangement to the pointer on the dial. A preliminary graduation in comparison with a good mercury barometer enables the atmospheric pressure to be shown.

Anethum, a genus of Umbelliferæ, now included in Peucedanum, is the dill. *A.* (or *P.*) *graveolens*, the common dill, native of S. Europe, Astrakhan, Egypt, and the Cape of Good Hope, was mentioned by Hippocrates and Dioscorides as a medicinal and savoury herb. The fruit is used as a condiment.

Aneurin, or Aneiron (*fl. c.* 603), a Welsh poet, supposed to be the son of Caw ab Geraint, a Welsh chieftain. According to another account he is said to be the same as the historian Gildas. He was educated at St. Cadoc's College at Llancarvan. His chief poem, *Gododin*, tells of the victory of the Saxons over the Britons at Cattraeth, at which A. was present. He is supposed to have been assassinated by Eidyn ab Einygan. *Gododin* was translated into English in 1809 by Edward Davies.

Aneurism, a circumscribed dilatation of an artery formed of one or more of its coats. A *false A.* is one in which the coats are ruptured; *miliary As.* are minute As. occurring along the course of the blood-vessels of the brain; an *arterio-venous A.* is occasioned by a direct connection between an artery and a vein, the latter becoming pulsing and dilated; *mycotic As.* are caused by collections o. bacteria within the arteries.

As. may be caused by *arterio-sclerosis*, or the thickening of the arterial coats, the plugging of a vessel by particles of fibrin or by bacterial growths or by any sudden strain or injury. It is found that men in the active period of life are most affected, pointing to the probability of the condition being caused by strain.

Most cases involve the thoracic portion of the aorta. If the A. is small it may give rise to no physical signs, but if large, pain is constant owing to the compression of other organs, a prominence like a pulsating tumour may be formed, and pressure upon the wind-pipe may give rise to a paroxysmal cough and constant shortness of breath. There is always danger of perforation and a speedy death, but if the condition is recognised and treated, it may pursue its course for a protracted period until the A. ruptures and hæmorrhage into the adjacent cavities or organs takes place Pulmonary complications, such as tuberculosis or fibrinous pneumonia, may be set up, and in any case there is growing weakness. The treatment aims at the coagulation of the blood, and secondly, the contraction, of the sac. To secure the first, absolute rest

in a recumbent posture is advisable, but if that cannot be enforced, exertion should be reduced to a minimum, and liquid should form as small a proportion of the diet as possible. Contraction of the sac appears to be promoted by the use of potassium iodide.

An A. of the abdominal aorta may press against the vertebræ and erode the bone, when compression of the cord may take place, producing paralysis. If the growth be low down it may be possible to effect a cure by pressure, which must be maintained for at least twenty-four hours under an anæsthetic.

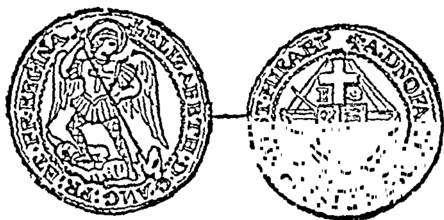
Angara is a Siberian riv. which flows through Lake Baikal and joins the R. Jenisei after a course of 1300 m. The principal tn. on its banks is Irkutsk.

Angeioleucitis (Gk. ἀγγεῖον, vessel, λευκός, white), or *Lymphangicitis*, is a medical term to express inflammation of the lympahtic vessels. *L. prolifera* is cancer of the lymphatics.

Angel, the word angel is derived from the Gk. ἄγγελος, a messenger, which is the translation of the Hebrew 'mal'akh'; and in both the Old and N.Ts. it represents a spiritual being awaiting God's commands, a messenger, and a means of manifestation of God to man. In the early historical books of the Bible the A. especially represents a manifestation of God Himself. Sometimes it has no form—only a voice is heard, as when the A. of God spoke unto Jacob in a dream (Gen. xxxi. 11); and sometimes there is a form resembling that of a man, as when Abraham was visited by three men (Gen. xviii.), when two As. came to Lot and did eat unleavened bread with him (Gen. xix.), and when Jacob wrestled with a man until the breaking of the day (Gen. xxxii. 24–30). Later an A. represented a messenger who carried out the commands of the Lord. In 2 Sam. xxiv. 16, when the A. stretched out his hand to destroy Jerusalem, the Lord commanded him to stop; and in Exod. xxiii. 20–23 the Lord sent an A. to bring the people of Israel to the place that was prepared for them, telling them that they were to obey His messenger, for His name is in him. A comparison of the passages Exod. xxxii. 34 and xxxiii. 2 with the passage Isa. lxiii. 9 implies that there was a distinction between the 'A. of the Lord' and the subordinate As. As. have also been called by other names—'Sons of God' (Gen. vi. 2). 'Sons of the mighty' (Ps. lxxxix. 6), 'Saints' (Zech. xiv. 5), and 'Holy Ones' and 'watcher' (Dan. iv. 13). In the passage Ps. ciii. the As. excel in strength, they are God's ministers a[nd] hosts that do his pleasure; and [in] 1 Kings xxii. 19 they are a host [of] heaven standing on His right hand an[d] on His left. The notion that they a[re] warlike beings is found in Joshua [v.] 13 (a man with a sword drawn in h[is] hand), and in Ps. lxviii. 17, when th[e] As. appear in the twenty thousan[d] chariots of God. The whole hosts o[f] As. are divided into different sections of which the archangels are the greatest. In Daniel this idea is shown for Persia and Greece have special As. called princes (Dan. x.). Michael is the prince (Dan. x. 21), and Gabriel is the 'angelus interpres,' the angel interpreter. In the post-canonical books and in the apocalyptic literature the names, ranks, and classes of As. are given. The chief archangels are Michael, Gabriel, and Raphael, who with Uriel, Chamuel, Jophiel, and Zadkiel, stand before God. Israfel, 'the sweet singer,' is generally regarded as the A. of death in the Mussulman mythology. In the Book of Enoch, cherubim and seraphim are mentioned as being distinct classes of As., and Raphal and Phanuel are individual archangels. In Job i. 6, Satan is spoken of as one of the sons of God. Evil As. are mentioned in Ps. lxxviii. 49, but they are not evil themselves—they are so called because through them God destroys the vines and flocks of the faithless and visits them with pestilence. The same idea is expressed in Judges ix. 23 and in 2 Kings xix. 35. In the N.T. guardian As. are frequently mentioned who rejoice and grieve with individuals, as in Matt. xviii. 10 and in Luke xv. 7, 10. According to the passages Heb. ii. and 1 Cor. vi. 3, the As. are inferior to Christians, nevertheless, according to Rev. xiv. 16, Heb. i. 14, and 1 Peter i. 12, the As. take their part in ministering God's word. A host of As. attended Christ on His ascension into heaven, and they will also accompany Him on His second coming to judge the world. A. worship is strictly forbidden by St. Paul (Col. ii. 18), nevertheless it has been gradually established—although opposed by Theodoret, Augustine, and others—and is one of the beliefs of the Roman Catholic Church. From Eph. i. 21 and Col. i. 16 we learn of the existence of a hierarchy, thrones, dominions, principalities, powers, and might being mentioned. Pseudo-Dionysius of the fifth century in his work entitled *De Hierarchia Celesti* gives a full account of this angelic hierarchy. In the Book of Revelation As. play an important part. There are the As. of the seven churches of Ephesus, Smyrna, Pergamos, Thyatira, Sardis, Philadelphia,

and Laodicea (i. 20, ii. iii.). An A. seals the servants of God in their foreheads (vii. 3). Seven As. with trumpets stand before God (viii. ix. x.); there was war in heaven when Michael and his As. fought against the dragon (xii.); and seven As. had golden vials full of the wrath of God (xv.). The Devil and his associates who were expelled from heaven (Milton, *Paradise Lost*) are sometimes called the Fallen As.; the Devil also having the name of Lucifer, 'light-bringing,' *i.e.* the morning star.

Angel was originally a gold coin of France, where it was first coined in 1340. It was introduced into England by Edward IV. 1465, when it was valued at 6*s*. 8*d*., and being of the same value as the noble, was sometimes called the angel-noble. Under



ANGEL (reduced about one-half)

Henry VIII. its value was raised to 8*s*. and under Mary to 10*s*., and it was last coined by Charles I. The device on the obverse of the coin was St. Michael piercing the dragon with a spear, and on the reverse it had a ship, with a large cross for a mast, and the royal arms in front.

Angel-fish, or Monk-fish (*Squatina angelus*) is a shark much resembling the ray. This elasmobranch is the type of the family Rhinidæ and order Selachii, and is found round the coast of N. America.

Angeli, Heinrich von (*b*. 1840), Hungarian *genre* and portrait painter, studied at the Vienna Academy, of which he was professor from 1877, and at Dusseldorf under Leutze. He painted the portraits of many distinguished people, including Queen Victoria, the Austrian emperor, and the German crown prince. Amongst his other pictures the best known are 'Mary Stuart on her way to the Scaffold,' 'Antony and Cleopatra,' 'Louis XI. and St. Francis of Paola,' and 'The Avenger of his Honour.'

Angelica, a plant of the order Umbelliferæ of which the candied roots form a sweetmeat. *A. archangelica*, or *Archangelica officinalis* is cultivated for its aromatic odour

Angelico, Fra (1387–1455), a famous Florentine painter, who was also a Dominican monk. His full name was 'Il beato Fra Angelico Giovanni Angelico da Fiesole,' or in Eng. 'the Blessed brother John, the angelic of Fiesole.' He was *b*. at Vicchio. The early part of his life was spent at Florence and the latter at Rome, where he was summoned by the pope. He is famous for his frescoes, which are at Rome, Florence, Fiesole, and other It. towns, the most wonderful being the series in San Marco, Florence.

Angell, George Thorndike (1823–1909), American philanthropist, *b*. at Southbridge, Mass., U.S.A. Admitted to the Boston bar in 1851. In 1868 became President of the Mass. Soc. for Prevention of Cruelty to Animals. Became editor of *Our Dumb Friends*. Initiated the movement for the estab. of the Bands of Mercy. In 1889 founded and became President of the American Humane Education Society. Notable also as a criminologist.

Angeln is a dist. in Prussia between the Baltic and the Schlei. It is said to be the original country of the Angles who in the fifth century invaded England.

Angelo Buonarroti the Younger (1568–1646) was *b*. at Florence and *d*. at Rome. He was the son of Leonardo di Buonarruoto, brother of the great Michael Angelo; he studied mathematics and natural philosophy under Galileo, and became a member of the Academy of La Crusca and of the Florentine Academy. He is chiefly famous for *La Tancia*, a drama, and *La Fiera*, a series of five comedies.

Angelot, a gold coin, struck in France by Henry VI. of England; also a Fr. gold coin first struck in 1340; also a musical instrument like a lute.

Angelus à Sancto Francisco, the assumed name of the Franciscan monk, Richard Mason (1601–78), author of *Regula et Testamentum S. Francisci*, 1643; *Apologia pro Scoto Anglo*, 1656, and other rare works.

Angelus Bell, in Roman Catholic countries, is a bell rung three times a day, at dawn, noon, and sunset, to call the faithful to prayer. It was instituted in 1326. Its name is derived from A. Domini, the angelic salutation to the Virgin Mary. Millet has painted a famous picture with this title.

Angelus Silesius (1624–77), a Ger. poet and philosopher, *b*. at Breslau. His proper name was Johann Scheffler. He first practised medicine, but in 1653 joined the Roman Catholic Church, though his parentage was Protestant. He wrote books on mysticism and also many hymns, which are still used by Protestants in Germany.

Anger (Icel. *angr*, pain) is a primi-

tive emotion, often associated with fear, which is experienced by man in common with higher animals. The primary instinct which accompanies its origin is the desire for breaking down opposition, which may be properly accomplished or merely find blind outlets for its satisfaction. In its lowest forms A. suggests destructive violence and infliction of pain on the object, animate or inanimate, which aroused it, or even on inoffensive objects which have had no share in causing it. In a higher form it desires to inflict mental suffering: here again the angry party receives relief from imposing it on innocent victims. From this it will be seen that it has a deadening effect on the reasoning faculty, and is, in fact, a form of temporary madness. It is in direct opposition to a sane mental attitude that the infliction of pain should cause pleasure, yet in anger there is an undoubted feeling of pleasure in creating suffering. *Righteous indignation* does not necessarily involve personal injury, but may have its origin in an injury done to another or in a miscarriage of justice; its indulgence is also creative of more or less pleasurable emotion as its owner rises in his own estimation. The use of bad language is an outcome of A. which breaks down opposition in the form of the barriers erected by religion or convention.

The physical accompaniments of anger are changes in colour (usually flushing, but in some cases pallor), aggressive postures, agitated respiration, quickened heart-beats, muscular changes of the eyebrows and jaw—arising from protective and biting instincts—contraction of the pupils, glandular secretions (such as tears and increased flow of saliva). The feelings find expression in animals in snarling and growling, in man in crying, screaming, and hysterics. *See* A. Bain's *The Emotions and the Will*, 1899; C. R. Darwin's *Expression of Emotions in Men and Animals*, 1904; G. F. Stout's *Manual of Psychology*, 1901; H. M. Stanley's *Evolutionary Psychology of Feeling*, 1895; P. Jessen's *Versuch einer wissenchaftlichen Begründung der Psychologie*, 1855.

Angerburg is a small tn. with a castle, on the Gross-Mauer Lake, Eastern Prussia. Pop. 5000.

Angermanland, a dist. in Sweden and under the gov. of Westernorrland. It is a wild and picturesque country, and well cultivated. Its riv. the Angerman is over 200 m. in length, and joins the Gulf of Bothnia at the principal tn. of Hernösand. The riv. is navigable near its mouth.

Angermünde, a tn. in the Potsdam dist. of Prussia, just over 40 m. N. of Berlin. It has large iron works and a woollen industry.

Angers, the old cap. of Anjou in France, now in the dept. of Maine-et-Loire. Its old name was Andegavum. It is the see of a bishop, has a large theological college and a fine library. The castle, now used as a prison, and the cathedral were both built in the thirteenth century. The R. Maine is navigable at this point, and the dist. has extensive industries in wool and cotton. Large slate quarries are also in the vicinity. Pop. 84,000

Angers, Sir Auguste Réal (1838–1919), Canadian statesman, was *b.* in Quebec, where he practised for some time as a lawyer. From 1874 till 1879 he sat in the Quebec Assembly, for the last three years as leader of the gov. He subsequently became a puisne judge of the supreme court, which post he resigned in 1887, and was lieutenant-governor of the prov. till 1892. He joined the Thompson administration, and retained his position under Sir M. Bowell, but resigned in 1895 over the Manitoba school question. He retired from politics in 1896 on the defeat of the Tupper administration. He took an active part in the completion of the N. Shore Railway between Montreal and Quebec.

Angerstein Gallery, *see* NATIONAL GALLERIES, THE.

Angevin Line of Eng. kings began with Henry II. (1154), who was son of the Count of Anjou (whence the name), and ended with Richard III. (1485). John is sometimes erroneously described as the last of the A. dynasty, because he was the last Eng. king to reign over Anjou.

Anghiari, tn., N. Italy, 10 m. N.E. of Arezzo. The scene of the defeat of the Milanese by the Florentines in 1440. Pop. 8086.

Angilbert, Saint (*c.* 740–814), the friend and counsellor of Charlemagne, whose daughter, Bertha, he married. He ultimately became a monk. He was a distinguished poet and was described by Charlemagne as the 'Homer of the age.'

Angina, a medical term for any inflammatory disease of the throat or trachea which hinders breathing or swallowing. *A. humida* is croup.

Angina Pectoris, a paroxysmal pain accompanied by a sense of intense oppression about the heart. It is rather a symptom of disease of the heart or arteries than a disease itself, and usually occurs in men over forty. The immediate cause of the attack is usually due to exertion or emotion; there is a sudden pain affecting the whole chest, then radiating through the left shoulder and penetrating

sometimes right down to the fingers. Accompanying the pain is a sense of impending death, the respiration is shallow or arrested, and the patient's anxiety becomes extreme. The attack may suddenly cease, and although there is temporary weakness, there may be no other signs of the disease until another attack. The number and frequency of attacks vary; there may be only one or two, there may be a chronic form in which the attacks grow in intensity, or a number of severe attacks may end with complete recovery. Usually the outlook is very grave.

The treatment aims at the prevention of the attack. The patient should always carry about with him small glass capsules filled with amyl nitrite, which may be broken into a handkerchief and the vapour inhaled. In the intervals between the attacks any predisposing causes, such as *arterio-sclerosis*, should be treated; gymnastic exercises in the form of passive movements are generally of utility.

Angiolieri, Cecco (*c.* 1250-*c.* 1312), It. humorous poet and contemporary of Dante, on whom he wrote three uncomplimentary sonnets. In his poems he shows himself as an undoubted *bon viveur*, with a marked predilection for wine and women. About 120 of his sonnets are still extant.

Angioma, a vascular tumour caused by the enlargement or new formation of blood-vessels. There are several varieties.

Angiosperms (Gk. ἀγγεῖον, vessel, σπέρμα, seed) include the highest forms of plant life. Together with Gymnosperms (pines, etc.) they make up the great group of Phanerogams, Spermaphyta, or flowering plants; they differ from Gymnosperms in having the carpels arranged so as to form an ovary for the ovules, and in forming endosperm after fertilisation instead of before it.

The A. are divided into two classes, the Dicotyledons and Monocotyledons; in the former are such flowers as buttercups, primroses, and nettles, in the latter arum lilies, grasses, and daffodils. These flowering plants do not necessarily have bright petals or sepals, but it is essential that they should have carpels and stamens; reproduction, however, may take place also by budding, apogamy, or parthenogenesis.

Angkor, the old cap. of Cambodia in Asia, but now only the ruins of a city. It is surrounded by high walls, it is about 2 sq. m. in extent, and five gates give entrance to the city. The name A. is a corruption of Nakhon Thom or Nagara Thom. Further wonderful architectural ruins are near, known as A. Wat.

Angle, the difference in direction of two lines. If the lines are straight the A. is *rectilinear*, if curved the A. is *curvilinear*. A curvilinear A. is measured by the A. between the tangents to the curves at the meeting point. As. are usually measured in degrees, one degree being 1-360th of a complete revolution. In circular measure the unit is a *radian* which is an A. at the centre of a circle opposite an arc equal in length to the radius; there are 3·14159. . . radians in 180°. A *solid A.* is the space contained by three or more planes meeting at a point. A *dihedral A.* is an A. between two planes, a *trihedral A.* one between three planes. *As. of incidence, reflection*, and *refraction* are, in physics, the As. formed by the direction of a wave with the normal to the surface at the point of incidence, reflection, or refraction. The *critical* or *limiting A.*, in light, is the A. at which a ray of light strikes the surface between two media so that the refracted ray passes along the surface. The *critical A.*, in friction, is the A. at which the component of the weight directed down the slope of the inclined plane balances the friction. The *A. of capillarity* is the A. formed, due to surface tension, when a liquid is placed in contact with a solid.

Angle Capital (arch.), a capital on the corner column of a portico.

Anglers are any fish of the div. Pediculati of the order Teleostei, and belong to the family Lophiidæ. The *Lophius piscatorius*, known also as monk-fish, sea-devil, frog-fish, or goose-fish, angles for its prey in a peculiar fashion. The three anterior spines of the dorsal fin are transformed into tentacles, the foremost of which ends in a bright, worm-like tip which acts as bait and can grow again readily. The A. swims badly and lurks near the coast; it attains a length of 3 to 5 ft., and is found in Europe and America.

Angles, or Angli, a Ger. tribe who occupied the dist. of Schleswig-Holstein, a large number of whom came to Britain in the fifth century and settled in E. Anglia, Mercia, and Northumbria. From them the name 'England' is derived (Angleland). These people were first mentioned by Tacitus, who states that they were a part of the Suevi, and Lindenbrog and Leibnitz have preserved fragments of the anct. laws used in common by the Angli and the Varini.

Anglesey is an is. off the N. Wales coast, and divided from the mainland by the Menai Straits. It is 21

m. long by 19 broad. It forms a co. and sends a member to parliament. Lead, copper, and zinc are among the ... and sheep- ... ried on. It ... by a fine suspension bridge and also by the Britannia Tubular Bridge. Holyhead is an adjoining is., and the starting place of the route to Ireland. Beaumaris, Holyhead, and Amlwch are the chief tns. Pop. 51,744.

Anglesey, Henry William Paget, first Marquis of (1768–1854), and a son of the Earl of Uxbridge. He entered the army and served in Flanders and the Peninsula. He was created Marquis of A. for his bravery at the Battle of Waterloo, where he lost a leg. He was appointed lord-lieutenant of Ireland in 1828, and was afterwards responsible for the Irish Board of Education.

Anglia, E., a kingdom founded by Uffa in 575, which consisted of Norfolk, Suffolk, Cambridge, and the Isle of Ely, and formed one of the kingdoms of the Saxon Heptarchy. It was afterwards dependant on Mercia, and submitted to Egbert, King of Wessex, in 826. Soon after it was invaded by the Northmen, and became a Danish kingdom, until it was taken by Edward the Elder, 921. Under Canute it was one of the four great earldoms, the other three being Northumbria, Mercia, and Wessex.

Anglican, *see* CHURCH OF ENGLAND.

Anglicanism is the name given to the body of doctrines and observances in the Church of England (*q.v.*) and of those churches throughout the world in communion with it. The recent history of Anglicanism in Great Britain has been that of the struggles of the different sections within it, but chiefly that of the Anglo-Catholic and Evangelical parties. The Anglo-Catholics (*q.v.*) hold to a body of doctrines which tend, increasingly, to resemble in dogma and ritual the beliefs and practices of the Roman Catholic Church. This section is popularly known as the High Church party. The Evangelicals, termed the Low Church party, have sought to preserve the teachings and practices of the Protestant Reformation. The drift 'Romeward' of the Anglo-Catholic section became so pronounced towards the end of last century that Parliament appointed a Royal Commission in 1904 to consider the matter of ecclesiastical discipline. The Commission reported in 1906, and its report set in motion a movement for the revision of the ... . This, as ... day, is es- ... Charles II. (1662) and it was held by many, of all parties in the Church, to require revision to bring it more into line with the requirements of to-day. So began that revision of the Prayer Book which forms the outstanding event in the recent history of Anglicanism.

The National Assembly of the Church of England in July 1927 passed, by 517 votes to 133, the Prayer Book Measure. The majority included thirty-four bishops and the minority four bishops. This measure allowed certain alternative or additional forms of worship to that in the Prayer Book, and, from the colour of its cover, the new Prayer Book was known as the Green Book. Measures passed by the National Assembly require the assent of both Houses of Parliament and of the Crown. The House of Lords gave its assent to the Prayer Book Measure by 241 votes to 88, but the House of Commons on Dec. 15, 1927, rejected the measure by 238 votes to 205. The bishops deeming this rejection due to 'avoidable misunderstandings,' slightly revised the measure, which was again approved by the Assembly (396 votes to 157), but once more, in June 1928, failed (by 266 votes to 220) to secure the approval of the Commons. Thereafter the bishops decided to put into force the non-controversial parts of the Green Book.

Angling is the art of catching fish with a line and hook which is baited with worms, flies, or small fish. The antiquity of this pastime is proved by mention of it in the works of Gk. and Lat. writers, while allusions to it appear in the O.T., and the pursuit of A. is known to have been practised in anct. Egypt. Much has been written about it, and the oldest work printed in Eng. on the subject was issued in 1496 by Wynkyn de Worde. The volume also contained chapters on hunting and hawking, and to a woman belongs the honour of being first to write on the piscatorial art, for the work is ascribed to a nun, the prioress of a nunnery in Hertfordshire, Dame Juliana Berners.

The most famous work on the subject, however, is that of Izaak Walton, ... Street, whose ... *Angler, or the* ... *Recreation,* is ... first ed. ap- ... assed through ... thor's life, the last being in 1676. With the later eds. a treatise was added by Walton's friend, Charles Cotton, containing instructions how to angle for a trout or grayling in a clear stream. This essay is still usually printed with the work.

The Compleat Angler is in truth more than a work on fishing, for the author depicted the delights of the countryside with great delicacy and charm, and the unaffected humour of the dialogue and its purity of style all add to the high reputation of the book.

Since Walton's day the output of books upon the subject has been very prolific, and among the principal may be mentioned, Stewart's *Practical Angler*, Halford's *Fishing* and *Dry Fly Fishing*, Kingsley's *Chalk Stream Studies*, Marston's *Walton and the Earlier Fishing Writers*, Hodgson's *Trout Fishing*, Sir Herbert Maxwell's *British Fresh Water Fishes*, and Sir Edward Grey's *Fly Fishing*. This is by no means a full fishing bibliography, but it is sufficient to introduce the reader to the best that has been written on this interesting topic. In this article we shall deal with fresh-water fishing, for sea fishing scarcely comes under the head of A., and is treated in its proper place, although the trout and the salmon can be caught both in the riv. and in salt water. Both these fish come up to the fresh water to spawn.

The chief appliances needed by anglers are the rod, line, and hook. The first are made of various materials. Cane rods are the most common and the lightest, but other rods are made of yellow deal in a 7 ft. joint, a hazel joint of 6 ft., with a piece of fine-grained yew tapered to a whalebone top and measuring about 2 ft. Salmon rods are frequently made wholly of ash with a whalebone top. The reel is an apparatus for winding up the line, and is made of brass or hard wood. The line is made of gut or fine cord, and varies in length from 20 to 100 ft. according to the size of the water and the fish angled for. At the end is a piece of fine gut to which the hook is fixed, and above this is the float, made as a rule of quills, either of the porcupine or the goose, though for heavy fish or strong streams the floats are frequently of cork. All floats are loaded so as just to sink them all but the top. The angler must, of course, choose his bait with reference to his fish. Artificial flies are of two varieties, the dry fly and the wet fly; the former is just allowed to skim the surface of the water, while in the latter case the flies are heavier and will sink into the water if the line is allowed to become slack. The dry fly is perhaps more popular in the S. of England, while the wet fly is in vogue largely in the N. and in Scotland.

The finest fresh-water fish in this country is undoubtedly the trout, and affords the best sport to anglers. They abound in most of our lakes and rivs., and are usually angled for with an artificial fly. They are voracious, and by their agility and cunning afford many a spirited contest, for a trout will struggle for hours when once on the hook, and frequently succeeds in making its escape. A good landing-net is necessary for this fish. The trout usually spawns in October and November, sometimes earlier or later, according to the season.

The salmon is one of the angler's most coveted prizes and affords excellent sport. It is partly a fresh-water and partly a salt-water fish, though its spawn is generally deposited in the former. The spawning season is from the end of autumn until the beginning of spring. The length of rod for this fish is usually from 16 to 20 ft., and the best fly to use is a large one of gaudy colours. The Scottish rivs. are famous for their salmon.

Roach are frequently caught with flies beneath the water, and this fish will bite at most baits, but a strong tackle is needed to land the capture. The perch is a bold-biting fish, but, curiously enough, it will never touch a fly. The best bait is a minnow allowed to float about 6 in. from the ground. The pike, or jack, as the young ones are called, are perhaps the greediest of fish, and spawn about March in very shallow water. The finest specimens are those found in clear rivs. The best bait is a small fish.

The barbel is rather a heavy, dull fish, and does not give such good sport as many others, and for this it is a good plan to use ground bait, sometimes put in over-night. The blay is a common riv. fish, which can usually be caught in the same way as trout. Bream are generally reckoned as pond fish, although they are sometimes met with in slow-running streams. In fishing for these the angler should take care to keep concealed from the fish and let his bait sink near the bottom among the weeds. Carp are also a pond fish, and thrive best in a rich soil, but never well in cold, bare waters. Another well-known pond fish is the tench, but these are also found in sluggish rivs. They are noted for frequenting the foulest and muddiest portions of the pond, so the fisherman must angle for these very near the bottom and allow the fish plenty of time to gorge the bait. They are in season from September until the end of May. Grayling are a remarkably timid fish, and must be angled for with very fine tackle, and when hooked the angler must be careful to work the catch carefully as the hold gives way easily

n the mouth. They will return to he bait, however, as a rule. That ised for trout is generally found effec-ive for this fish. The chub will rise asily at a natural or an artificial fly, nd at spawning time will take most ait, such as worms, etc. They isually require the aid of a landing-net.

Dace are very active and cautious, out will nearly always rise to the fly of a skilful angler. They frequent ravelly and sandy bottoms and deep, veed-shaded holes. In sultry weather hey are often caught in shallows with entles or grasshoppers. Bread and oran kneaded into small round cakes s a very good ground bait for these ish, but it must always be thrown up-stream. The gudgeon is allured with lmost any kind of bait. It spawns wo or three times a year, and fre-uents gentle streams with gravelly oottoms. In A. for gudgeon a good olan is to stir up the bottom previ-ously, which rouses the fish from a tate of inaction and causes them to collect in shoals. Some anglers will ise two or three hooks for this fish. A float is always used, but time should oe allowed for the fish to nibble at the oait, as they will do this for some time oefore swallowing it. The loach can oest be caught with a small red worm, while minnows are of little use for sport, but make excellent bait for pike, trout, salmon, and other fish. Close seasons are observed for most fish according to their natures and haunts.

For further details of all these fish mentioned here the reader is referred to the articles under their various headings, where their natures, habits, and haunts are dealt with more fully. Those we have mentioned here are, of course, those taken by anglers in Great Britain. The Anglers' Associa-tion is the chief body in this country which looks after the interests of this sport.

Anglo-Catholics are, as their name indicates, those in the Church of England who regard that church as part of the universal, or Catholic, church. This section, therefore, tends to resent the term Protestant and to stress the term Catholic. The more popular name for this party is the "High Church" party. Anglo-Catholicism is undoubtedly a growing power in the Church of England, and the increase of its influence can be ascribed, in part, to the zeal of its adherents and the intellectual emi-nence of its protagonists. A.-Cs. are organised in the English Church Union, and their most influential organ is the *Church Times*. From time to time Anglo-Catholic con-gresses are held in London, which afford evidences of an emotional fervour that has been compared to that roused by the great Wesley, the founder of Methodism.

In general it may be said that A.-Cs. display a desire for recognition by the Roman Church. The claim to Papal Infallibility is denied, but in many churches in England the whole of the Roman ritual and dogmas are practised and inculcated. How far the movement has progressed from, say, the English Protestant position of the eighteenth century may be gauged by the 'Declaration of Faith,' issued in June 1924. This document, signed by 3000 Anglican clergymen (including Bishop Gore), was directed to the Orthodox Patri-arch of Alexandria, and stated, *inter alia*, that the signatories held that the consecrated elements in the Anglican Eucharist 'become the true Body and Blood of Christ, and we hold that Christ, thus present, is to be adored.' The Prayer Book Mea-sure, 1927 (*see* ANGLICANISM) was the Church Assembly's attempt to direct and control the movement.

Anglo-Israelite Theory. During the closing years of the kingdom of Israel, it is known that a considerable pro-portion of the inhab. of N. Palestine were carried into slavery. In the reign of Pekah no fewer than 27,000 individuals appear to have been taken to Media and Mesopotamia, after the fall of Samaria in 721 B.C. (2 Kings xv. 29). The kingdom of Judah was treated in a similar fashion by Baby-lon in 587 B.C., but history, whilst recording the return of the latter, is silent regarding the fate of the former. Thus the ten tribes which were lost disappear from history entirely, and naturally many theories have been propounded as to their probable fate and present-day whereabouts. One of these is that the inhab. of Great Britain and the U.S.A. are sprung from these lost tribes. This theory, known as the Anglo-Israelite Theory, though even now promulgated, has not made much headway. For par-ticulars see *Philo-Israel, An Enquiry establishing the Identity of the British Nations with the Lost Tribes*, 1899, and the *Book of Mormon* by Joseph Smith.

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Anglomania is a term used for the imitation amongst the Fr., Germans, or other foreigners of Eng. manners and customs, or an admiration of anything Eng. In the eighteenth century Eng. literature was greatly admired in Germany, and numerous Eng. books were translated into Ger. In France, just before the outbreak of the Fr. Revolution, there was a decided admiration for the free institutions of England. On the other hand, Anglophobia is a horror or fear of anything English.

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Angostura (Santo Tomé de la Nueva Guayana), now Ciudad Bolivar, on the Orinoco, is the cap. of Bolivar, in the republic of Venezuela, S. America. It trades in indigo, sugar, tobacco, cotton, horses, cattle, dried meats, and skins. The Orinoco here narrows, giving its name to the city, which signifies *strait*. It was founded in 1764, and is the seat of a bishop. Pop. 12,000.

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in the mouth. They will return to the bait, however, as a rule. That used for trout is generally found effective for this fish. The chub will rise easily at a natural or an artificial fly, and at spawning time will take most bait, such as worms, etc. They usually require the aid of a landing-net.

Dace are very active and cautious, but will nearly always rise to the fly of a skilful angler. They frequent gravelly and sa [illegible] weed-shaded h [illegible] they are often [illegible] gentles or gra [illegible] bran kneaded into small round cakes is a very good ground bait for these fish, but it must always be thrown up-stream. The gudgeon is allured with almost any kind of bait. It spawns two or three times a year, and frequents gentle streams with gravelly bottoms. In A. for gudgeon a good plan is to stir up the bottom previously, which rouses the fish from a state of inaction and causes them to collect in shoals. Some anglers will use two or three hooks for this fish. A float is always used, but time should be allowed for the fish to nibble at the bait, as they will do this for some time before swallowing it. The loach can best be caught with a small red worm, while minnows are of little use for sport, but make excellent bait for pike, trout, salmon, and other fish. Close seasons are observed for most fish according to their natures and haunts.

For further details of all these fish mentioned here the reader is referred to the articles under their various headings, where their natures, habits, and haunts are dealt with more fully. Those we have mentioned here are, of course, those taken by anglers in Great Britain. The Anglers' Association is the chief body in this country which looks after the interests of this sport.

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of Angoulême. The cathedral is very old, and was restored in 1120. A considerable trade is carried on in paper in the dist., where there are many mills. Pop. 34,895.

Angoulême, Charles de Valois, Duke of (1573–1650), was *b.* in April, being the natural son of Charles IV. of France and his mistress Marie Fouchet. He was successively commended to the good wishes of Henry III. and Henry IV. During his early youth he conspired against Henry IV., and suffered imprisonment from 1605 to 1616. In the latter year he was released, and spent the rest of his life as a soldier and diplomat of France, taking part in the Thirty Years' War and being in command at the siege of La Rochelle. He was an author of some note.

Angoulême, Louis Antoine de Bourbon, Duc d' (1775–1844), was the eldest son of Charles X. of France, and was *b.* in August. He was educated at Turin in military studies, but retired from France at the time of the Revolution. In 1799 he married his cousin, Marie Thérèse, and on the recall of his uncle, Louis XVIII., to France he was made lieutenant-general of the kingdom. He attempted to oppose Napoleon's return in 1815, but was deserted by his troops. After the revolution of July he retired with his father, Charles X., into exile. He *d.* at Görz.

Angoumois, the name of one of the provs. of France before the Revolution of 1789. It is now included in the department of Charente.

Angoxa, Angoche, or Angosta, tn., riv., and coast dist. of Portuguese E. Africa. The dist. produces cocoa, sesame oils, ground-nuts, rubber, and ivory. The inhab. are mostly Arabs.

Angra do Heroismo, a seaport in Terceira, and cap. both of Terceira and of the whole group of the Azores. It is strongly fortified, has a cathedral, fine churches, a military college, and an arsenal. It exports grain and wine, but its harbour is very much exposed. Pop. 11,000.

Angra Pequena, a bay in S.W. Africa, lat. 26° 38′ S., long. 15° E., on which stands the tn. of Lüderitz. This was estab. in 1883 by a Bremen merchant of that name, and in 1884 the dist. was proclaimed a Ger. protectorate. The surrounding country is desert, and the harbour itself is not good, freight having to be landed by lighters. The tn. is connected by rail with the S. African system at De Aar.

Angri, tn. of S. Italy, 15 m. N.W. of Salerno; pop. about 7000.

Angström, Anders Jonas (1814–74), Swedish physicist, was educated at Upsala University. From 1867 to his death he was secretary to the Royal Society of Sciences at Upsala, at which university he had already occupied sev. posts. His chief work is *Optiska Undersökningar*, on spectrum analysis.

Anguilla, or Snake Is., one of the Leeward Is. (British W. Indies), has an area of about 35 sq. m. The surface is flat, and some cattle are pastured there: salt is also exported. Pop. 3890.

Anguis is a genus of reptiles of order Lacertilia and family Anguidæ. *A. fragilis*, the [illegible] snake-like [illegible] eyes, foun[illegible] America. The genus is viviparous.

Angul, dist. in the S.W. of Orissa div., Bengal. Rice is principally grown. Area 1681 sq. m.; pop. 200,000.

Angular Motion, the motion of a body about a fixed axis. As different parts of the body describe arcs of different lengths in the same time, the A. velocity is understood to be the velocity of a point at unit distance from the axis of rotation.

Angus, anct. name for the dist. of Forfarshire, Scotland, whence the earls of A. derive their title.

Angussola (or Anguisciola), Sophonisba (*c.* 1535–*c.*1625), was *b.* at Cremona. She was a famous Italian portrait-painter, and of her Vandyck is said to have declared that he learnt more from her conversation on art than from the best masters. She was called to the Sp. court by Philip II. to paint portraits of himself and his queen.

Anhalt, until 1918 a duchy of the Ger. empire, now a free state. The country is agric., and is generally fertile, the mountainous parts affording timber and some minerals, chief of which are lignite and salt. Commerce is brisk, sugar being made and exported in addition to the natural products already named. Till 1918 Protestantism was the state religion. Area 906 sq. m.; pop. 352,000.

Anhinga, the American snake-bird, darter, or water-turkey (*Plotus anhinga*), akin to the cormorants.

Anholt, a small Dan. is. in the Cattegat. It was occupied by the Eng. from March 1811 to Jan. 1814. Pop. 250.

An-Hui, or Ngan-Hui, prov. of China, bounded on the E. by provs. of Kiangsu and Chekiang, on the W. by Houan and Hupe, and on the S. by Kiangsi. Area about 55,000 sq. m. Estimated pop. 20,000,000. Ngan-king is the capital.

Anhydride, or anhydrous acid, a term applied to compounds formed by the dehydrating of acids, or which represent in their composition the

acid *minus* water. Thus sulphuric A. is $SO_3 = H_2SO_4 - H_2O$.

Anhydrite, a mineral consisting of calcium sulphate, but differing from gypsum in that it contains no water of crystallisation. The colour is white, red, grey, or blue, and it usually contains a small amount of sea-salt, being found in salt deposits. Nearer the surface the mineral absorbs water, and is converted into gypsum; its liability to this change makes it unsuitable for building purposes.

Ani, a ruined city of Turkish Armenia, about 25 m. S.E. of Kars, on the Arpa-chai. During the middle ages it was the seat of the Bagratide kings of Armenia. About 1062 it was taken and pillaged by the Seljuks, and during the next two centuries it was repeatedly sacked. Its ruin was finally completed by an earthquake. Sev. interesting remains (of buildings and the city wall) are still to be seen.

Aniche, tn., dept. of Nord, France, 8 m. E.S.E. of Douai. Has coal-mines, glass-works, and chemical manufactures. Pop. 8000.

Aniello Tommaso, called by corruption Masaniello (1623–47), a young fisherman, was *b.* at Amalfi and *d.* at Naples. At this time the Duke of Arcos, viceroy of Philip IV. of Spain, was governor of Naples, and in 1647 he levied a tax on fruit and vegetables. The people with A. as their chief rose in revolt, and the troops of the viceroy were defeated. Cardinal Filomarino was chosen as mediator between the viceroy and the people, and all imposts upon articles of consumption were abolished, and the privileges granted by Charles V. were restored. A. became insane and was killed in the cell of the Church del Carmine, where he had been addressing the people.

Aniline, amidobenzene or phenylamine, $C_6H_5{\cdot}NH_2$, first prepared by the dry distillation of indigo, whence it derives its name (Portuguese *anil*, indigo). It is now manuf. by the action of steam and iron scraps, together with a little hydrochloric acid, on nitrobenzene contained in a cast-iron cylinder with a stirring apparatus. Lime is added when the reduction is complete and the A. distilled with steam. It is also obtained by the electro-reduction of benzene.

A. is a colourless liquid, but if not pure it turns brown on exposure to the air, probably owing to the presence of sulphur compounds. It boils at 183° and has a sp. gr. of 1·021 at 16°. It is slightly soluble in water, but is easily dissolved in alcohol and benzene. It is very poisonous if taken internally, and workmen who are engaged in manufs. in which it is used often suffer from headaches and nausea through inhalation of its vapours. It forms salts with the mineral acids, combines with alkyl iodides to form secondary and tertiary amines, and when heated with acetic acid it produces acetanilide or antifebrin.

A. is largely used for the manuf. of dyes and the preparation of benzene derivatives. The so-called A. dyes (*see* DYES) are not necessarily derivatives of A., but were developed after the study of A. compounds which give pure colours. *Rosaniline*, or magenta, is produced by the oxidation of A. and toluidine. By substituting methyl groups for hydrogen, the colour becomes reddish-violet and then bluish-violet as the number of methyl groups increases. By substituting ethyl, phenyl, or benzyl groups still more marked changes are produced, so that a series of reds and blues with all their intermediaries can be obtained in substitution products of rosaniline.

Anima Mundi, an anct. belief that all the chances and changes of the universe are due to an over-ruling consciousness, just as the ordering of the body is due to the operation of the human mind. Anaxagoras was one of the earliest westerns to believe that the universe was ordered by a single consciousness or reason. Aristotle held much the same view, but he held that nature itself is a living, conscious being, separate from God, who is a transcendent spirit. The Stoics' belief merged into pantheism, for they conceived of the A. M. as pure spirit, the one vital force pervading everything. The belief was revived by Agrippa of Nettesheim (1486–1535), who, however, changed the terminology to 'spiritus mundi,' and has been held with slight variations by many moderns, including Bruno, Sebastian Franck, Boehme, Van Helmont, More, and Cudworth.

Animalcule (dimin. of Lat. *animalis*, living being), a term formerly applied to the smallest forms of animal life such as can be seen only with the aid of a microscope. They include Bacteria, Protozoa, and Rotifera, and the term is applied in a loose sense to the Infusoria.

Animal Flowers, a name sometimes applied to the genus *Actinia*, a sea-anemone. The name, of course, originated in the resemblance to a flower of this polyp, which belongs to the animal kingdom.

Animal Magnetism, *see* HYPNOTISM.

Animal Worship is a cult found in some form or another in most anct. religions, and to be found at the present day among notable races. Its origin is doubtless due to various

interacting causes. Savages early held that animals had souls (*see* ANIMISM), and since the animals were swifter, stronger, and infinitely more cunning than themselves, they respected and feared them. Then the idea of the transmigration of souls led to the belief of the souls of ancestors being present in some particular beast. Connected with this is the totem system so general in America. Every tribe and div. has its totem or figure of an animal which it holds sacred, regarding the animal as its protector and its image as a charm. Somewhat similar to this was the Teutonic use of the boar, but the American Indians further claim tribal descent from the beast in question. The origin of this idea is quite uncertain. Herbert Spencer and many ethnologists hold that the confusion arose through a remote ancestor having received some nickname descriptive of him (*e.g.* if long-legged he might be nicknamed 'the crane'), and the surname having afterwards been taken literally. A.W. may be divided into two great classes, viz. that in which the animal itself is worshipped, and that in which the animal is reverenced as a symbol of a spirit. The principal race now practising A. W. are the Hindus. 'Here the sacred cow is not merely to be spared; she is, as a deity, worshipped and bowed to daily by the pious Hindu, who offers her fresh grass and flowers. Siva is incarnate in Hanuman, the monkey-god, as Durga is in the jackal; the wise Ganesa wears the elephant's head; the divine king of birds, Garuda, is Vishnu's vehicle; the forms of fish and boar and tortoise were assumed in those avatar-legends of Vishnu, which are at the intellectual level of those Red Indian myths which they so curiously resemble.'—Tylor's *Primitive Culture*. See A. Freud's *Totem and Tabu*.

Animals (Lat. *animus*, mind), living rganisms which are distinguished rom plants by their powers of locomotion, capacity for assimilating ganic substances, and the absence the compounds chlorophyll and llulose. None of these distinctions, owever, is complete; either may unicellular, may be unable to ove from the spot to which it is ached—plants are usually in this ndition, but they frequently have roductive cells or *spores* which free-swimming—and the food each is alike, consisting of water, rganic salts, carbohydrate, and teid materials. Corals remain ionary, whilst amongst plants, oms and certain algæ and fungi e distinct powers of locomotion; plants (*e.g.* the sundew) are invorous and digest organic matter; chlorophyll is absent from fungi; the cellulose cell-wall is absent in some plants and present in some A. such as tunicates, or sea-squirts. Both plants and A. frequently live in a parasitic state. A. require to have their carbohydrate and proteid substances already formed for them, and take into their systems in living or dead form pre-existing organic life; all green plants, however, which possess chlorophyll can, with the aid of sun and air, manufacture from inorganic salts their own carbohydrates and proteid substance. Both plants and A. are sensitive to external conditions [illegible] protoplasm. In [illegible] again great sin[illegible], for in the lowest forms of each cell-division may take place or specialised cells may form new life. Higher A. and higher plants differ from one another to a great extent, but the processes of nutrition and reproduction are common to both.

In view of the difficulty of an absolutely distinct line of demarcation, it is justifiable to assert that both forms of life have a common origin and that the processes of differentiation have roughly followed the two directions as laid down in the above definition. That both botanist and zoologist consider certain forms to belong to their respective spheres is a gain rather than a loss, and does not disturb the bases of their classification.

In all but the lowest A. the process of life is carried on by a more or less complex machinery of organs—muscles, alimentary canal, heart and blood-vessels, gills or lungs, nervous systems, organs of excretion and organs of reproduction. But in all A. as in all plants, the effective and essential part consists of protoplasm, and A. exist with structures varying from the mere mass of protoplasm of the amœba to the highly complex organism of man.

Classification.—Each large group is divided into phyla, which are divided either into classes containing orders or directly into orders, and these again are divided into families, genera, and finally individual species. In a very broad sense they may be grouped under the heads of Invertebrates and Vertebrates. The following groups or phyla are arranged in order of complexity:

A. Invertebrates. I. Protozoa, unicellular organisms such as amœba. II. Porifera, or sponges. III. Cœlenterata, including jelly-fish, sea anemones, and corals. IV. Platyhelminthes, or flat worms. V. Nemathelminthes, round or thread worms. VI. Trochelminthes, including rotifera. VII. Molluscoida, including

corallines and certain shell-A. VIII. Echinodermata, including star-fishes and sea-urchins. IX. Annulata, including earth-worms. X. Arthropoda, including crustaceans, insects, and spiders. XI. Mollusca, shell-fish and cuttle-fish.

B. Vertebrates. XII. Chordata, including A. possessing a structure called the *chorda dorsalis*, a cord of cells along the middle line on the dorsal side of the enteric cavity, developing into the backbone in vertebrata. It is an extensive and important group, including fishes (*Pisces*), reptiles (*Reptilia*), *birds* (*Aves*), and mammals (*Mammalia*). The Tunicata (*e.g.* sea-squirts) and Amphioxus or lancelet possess a notochord, and should properly be placed among the vertebrates.

Animals, Cruelty to. It was not until the beginning of the nineteenth century that any measures were taken either for the prevention or for the punishment of cruelty to animals. England took the lead, and founded the Royal Society for the Prevention of Cruelty to Animals, 1824, and Scotland followed in 1839. In 1879 the Fellowship of Animals' Friends was instituted; and the U.S.A., France, and Germany now have organisations for the prevention of cruelty to animals. By the Cruelty to Animals Acts of 1849, 1854, 1861, and 1876, and in Scotland by the Acts of 1850 and 1895, cruelty to animals is punishable by fine and imprisonment. By these *Acts animals are not to be ill-treated,* over-driven, or kept without proper food and water; dogs are not to be used for drawing carts; and bull-baiting, bear-baiting, dog- and cock-fighting are prohibited. There are also regulations for the slaughter of horses and cattle, and wild animals in captivity are protected by the Act of 1900. Homes for stray dogs and cats have been founded. *See* VIVISECTION.

Anime, a term applied to various oleo-resins, sometimes to a variety of copal, but most frequently to elemi. Brazilian A. is the *product of a* leguminous tree called *Hymenæa courbaril.*

Animism (Lat. *anima*, soul) was a term first used by the Ger. chemist Stahl in the early eighteenth century to denote the doctrine that all the *phenomena peculiar to the animal* world are produced by an immaterial 'soul' or vital principle distinct from matter. Dr. Tylor, however, in his *Primitive Culture,* 1871, used the word to denote the attribution of a living soul to inanimate objects and natural phenomena. *This use of the* term is that now generally employed, but it is often loosely applied to the general belief in the existence of a soul or spirit apart from matter; in a word, *to the belief in spiritualism and a spirit* world as opposed to materialism. The phenomena of death, sleep, dreams, hallucinations, sickness, shadows, etc., seem from the first to have exercised the minds of savage races. The body of a man after *death was in form the same as before.* What was the difference? Something had evidently departed. Similarly in sleep, some immaterial part of him seemed to depart and make voyages in lands he knew not. The two phenomena combined would inevitably lead to a belief that at death the soul of the dead merely went on another journey, and this idea would be strengthened by appearances in dreams and by the imagined appearance of ghosts. The action of the departed soul might be variously described. Some races taught the transmigration of souls: that they took new bodies, either human or animal, after each death. Some taught that the soul then set out on one laborious journey to the land of the blest, or else was doomed to wander in the neighbourhood it had occupied in life. Almost all races have held that the relation between living and departed is not broken, and also that the souls become by death more powerful both for good and for evil. The spirits can *be propitiated and pleased by offerings* of food, drink, and goods. Sometimes they remain near the earth to take vengeance for death or injuries done *them. They can also be controlled* by magic; hence the speedy rise of the sorcerer and medicine-man. Since fear is the chief emotion in the savage, it follows that evil spirits receive more attention than good ones, and so the influence of simple A. has generally a bad effect. The theory of moral retribution hardly exists. In one way, however, it may do, and this case is connected with the development of ancestor-worship (*q.v.*). Death did not change the character of the soul; a man went on doing the same *kind of thing after it as before.* The souls of ancestors, then, would be considered as watching over and protecting their descendants. The departed chief would still have the care of his tribe. Since, in the primitive state, every stranger is an enemy, almost all other spirits would be malignant. Here also arises the idea of moral retribution, for if in his lifetime the chief, the ancestor, had dispensed rewards and punishments to his inferiors, would he not continue to do so? By gradually working backwards, tribes practising ancestor-worship have sometimes come to the idea of a first source, the spirit of the first ancestor, lord of the dead, and

interacting causes. Savages early held that animals had souls (*see* ANIMISM), and since the animals were swifter, stronger, and infinitely more cunning than themselves, they respected and feared them. Then the idea of the transmigration of souls led to the belief of the souls of ancestors being present in some particular beast. Connected with this is the totem system so general in America. Every tribe and div. has its totem or figure of an animal which it holds sacred, regarding the animal as its protector and its image as a charm. Somewhat similar to this was the Teutonic use of the boar, but the American Indians further claim tribal descent from the beast in question. The origin of this idea is quite uncertain. Herbert Spencer and many ethnologists hold that the confusion arose through a remote ancestor having received some nickname descriptive of him (*e.g.* if long-legged he might be nicknamed 'the crane'), and the surname having afterwards been taken literally. A.W. may be divided into two great classes, viz. that in which the animal itself is worshipped, and that in which the animal is reverenced as a symbol of a spirit. The principal race now practising A. W. are the Hindus. 'Here the sacred cow is not merely to be spared; she is, as a deity, worshipped and bowed to daily by the pious Hindu, who offers her fresh grass and flowers. Siva is incarnate in Hanuman, the monkey-god, as Durga is in the jackal; the wise Ganesa wears the elephant's head; the divine king of birds, Garuda, is Vishnu's vehicle; the forms of fish and boar and tortoise were assumed in those avatar-legends of Vishnu, which are at the intellectual level of those Red Indian myths which they so curiously resemble.'—Tylor's *Primitive Culture.* *See* A. Freud's *Totem and Tabu.*

Animals (Lat. *animus*, mind), living organisms which are distinguished rom plants by their powers of loconotion, capacity for assimilating rganic substances, and the absence f the compounds chlorophyll and ellulose. None of these distinctions, owever, is complete; either may unicellular, may be unable to ove from the spot to which it is tached—plants are usually in this ndition, but they frequently have productive cells or *spores* which free-swimming—and the food each is alike, consisting of water, rganic salts, carbohydrate, and teid materials. Corals remain ionary, whilst amongst plants, oms and certain algæ and fungi distinct powers of locomotion; plants (*e.g.* the sundew) are invorous and digest organic matter; chlorophyll is absent from fungi; th cellulose cell-wall is absent in som plants and present in some A. suc as tunicates, or sea-squirts. Bot plants and A. frequently live in a parasitic state. A. require to have their carbohydrate and proteid substances already formed for them, and take into their systems in living or dead form pre-existing organic life; all green plants, however, which possess chlorophyll can, with the aid of sun and air, manufacture from inorganic salts their own carbohydrates and proteid substance. Both plants and A. are sensitive to external conditions and have an irritable protoplasm. In reproduction there is again great similarity, for in the lowest forms of each cell-division may take place or specialised cells may form new life. Higher A. and higher plants differ from one another to a great extent, but the processes of nutrition and reproduction are common to both.

In view of the difficulty of an absolutely distinct line of demarcation, it is justifiable to assert that both forms of life have a common origin and that the processes of differentiation have roughly followed the two directions as laid down in the above definition. That both botanist and zoologist consider certain forms to belong to their respective spheres is a gain rather than a loss, and does not disturb the bases of their classification.

In all but the lowest A. the process of life is carried on by a more or less complex machinery of organs—muscles, alimentary canal, heart and blood-vessels, gills or lungs, nervous systems, organs of excretion and organs of reproduction. But in all A. as in all plants, the effective and essential part consists of protoplasm, and A. exist with structures varying from the mere mass of protoplasm of the amœba to the highly complex organism of man.

Classification.—Each large group is divided into phyla, which are divided either into classes containing orders or directly into orders, and these again are divided into families, genera, and finally individual species. In a very broad sense they may be grouped under the heads of Invertebrates and Vertebrates. The following groups or phyla are arranged in order of complexity:

A. Invertebrates. I. Protozoa, unicellular organisms such as amœba. II. Porifera, or sponges. III. Cœlenterata, including jelly-fish, sea anemones, and corals. IV. Platyhelminthes, or flat worms. V. Nemathelminthes, round or thread worms. VI. Trochelminthes, including rotifera. VII. Molluscoida, including



supreme ruler and even creator. The soul has been conceived of in various ways, the material and the spiritual curiously blended. Anct. tradition in Europe and other countries has associated it with the breath. The Rom. custom of sucking in the breath of a dying person may thus have arisen. Other peoples connected the soul with the shadow; it will be remembered that Dante gives the dead none.

But primitive man makes no distinction between man and the lower animals. Animal worship would lead one to think he often conceives of them as greater than himself. Animals, too, appear in dreams; so they are given souls. Indeed, the worship of animals may have arisen from this principle. Dead animals are credited with a knowledge of how their remains are treated, and even with the power of taking vengeance on their slayers. But the idea is carried still further. In sickness strange spirits enter a man; they can change their abode, and are not the spirits of disembodied ancestors. The abode of these is fixed in natural and material objects. Hence on the one hand arises [illegible] other, nature [illegible] polytheism. [illegible] lower form, [illegible] compelled by [illegible] with the fetish. The conception [illegible] natural obje[illegible] soon develop[illegible] from the obj[illegible] free, in fact; [illegible] the animal tends more and more to become a mere symbol of the spirit. Similarly, the spirit which was at first contained in the corn, the tree, the river, becomes in time the presiding genius of the crops, the forest, etc.

Dr. Tylor postulates A. as the first requirement of religion, stating that nothing below this should be considered as religion. Strictly speaking, pure A. is not religion, but rather philosophy. It shows no form of emotion, but is a form of explanation of given phenomena. As we have said, the term is commonly used as above. A. is composed of simple elements. In later developments of religion some survivals generally remain of earlier superstitions which are quite irreconcilable with the later teaching. Not so with A.; rather are traces of its crude developments found in the earlier religions. Even in Christian and civilised countries fetishism (exemplified by the belief in charms, mascots, and lucky coins), magic (shown by the use of incantations, charms, and the faith in omens), etc., still have strong influence in many quarters. The nature religion has been taken up and explained by Christianity in the doctrine of the divine immanence, and is held in another form by various schools of nature worshippers. See E. B. Tylor's *Primitive Culture*, 1871; R. M. Dorman's *The Origin of Primitive Superstitions*, 1881; Sir James Frazer's *Golden Bough*; and for philosophy, Stahl's *Theoria*.

Animuccia, Giovanni (*c.* 1500–71), It. musician and composer. In 1555 he was appointed *maestro di capella at the Vatican*. His hymns, *Laudi Spirituali*, are said to be the origin of the oratorio. He composed a number of masses, motets, magnificats, madrigals, and other pieces.

Anio (modern Aniene or Teverone), a trib. of the Tiber, in Central Italy, which, after a course of 70 m., passing Tivoli, joins the main stream 3 m. above Rome. Since the third century its aqueducts have supplied Rome with water.

Anions, the negatively charged particles in a dissolved or liquid electrolyte. On electrolysis they pass to the positive electrode or anode, where they are discharged. The positively charged particles are known as *cations* or *kations*.

Anise, or *Pimpinella anisum*, is a species of the Umbelliferæ found in the S. of Europe. The fruit is known as aniseed, and is much used in flavouring.

Anjangaon, tn., Amraoti dist., Berar, India, on the Shahnur riv.; pop. 11,000.

Anjar, tn. of British India in Cutch, 10 m. from Gulf; pop. 13,510.

Anjer, seaport, Java, in the Strait of Sunda, 60 m. W. of Batavia. It was totally destroyed in 1883 by floods following on the Krakatoa eruption. Pop. 3000.

Anjou, an old prov. of France, now composing the dept. of Maine-et-Loire, and parts of those of Indre-et-Loire, Sarthe, and Mayenne. In Rom. times it was the territory of the Andecavi, whence the name of Angers the anct. cap., is derived. The son of Geoffrey V. of Anjou by Matilda, daughter of Henry I. of England, came to the Eng. throne as Henry II., and thus founded the Angevin line of kings. In 1204 Philip Augustus of France took it from King John. It was later bestowed as a fief upon Charles, the son of Louis VIII., who, conquering Naples and Sicily, became there the founder of the Angevin line. Charles was also Count of Provence, and for nearly half a century the two were united. Margaret, daughter of Charles II. of Naples, took A. with her as part of her dowry to Charles of Valois. In 1328, on the accession of her son, Philip VI. of France, it was joined to the Fr. crown. In 1360 it

Ireland (1702–14), was *b.* on Feb. 6, 1665. She was the second daughter of James II. (of England, but James VII. of Scotland). When she was six years old her mother died. Although her father had professed his adherence to the Catholic Church, A. was educated in accordance with the ideas of the Anglican Church. She married, in 1683, Prince George of Denmark, who possessed little inclination for the active work demanded of those interested in public affairs, and much less ability. Soon after her marriage, Mrs. Churchill, wife of Colonel Churchill (afterwards Duke of Marlborough), was appointed to the position of lady to the queen's bedchamber. Needing support, the Queen made Mrs. Churchill her intimate friend and confidante. How Mrs. Churchill used that favour to the advancement of her husband's interests and the furtherance of her own personal desires all the world knows. While her father reigned A. lived a life of seclusion, the glamour of court life holding no attractions for her, but as soon as William of Orange had landed, she hurried to his side. On his death she succeeded to the throne. Although A. bore seventeen children only one survived infancy, and he, Philip, died in his twelfth year. Colonel Churchill (now the Duke of Marlborough) and his wife secured a great amount of influence over A., and she was involved with the Churchills in not a few intrigues concerning the return of her father and Jacobitism. In her reign the beginnings of party gov. are noticed. Intense and bitter contention characterised the attitude of one party to the other, and the queen, by the constant determination she showed " securing the throne to her brother James, the Elder Pretender, made matters worse. She possessed few ideas concerning constitutional gov. Such as they were opposed the atmosphere of political and religious freedom. The Marlboroughs now abandoned the cause of James II. This disappointment, together with the constant bickering between and even among the different parties, gave A. a considerable amount of trouble. A breach developed between the queen and her one-time favourite, the Duchess of Marlborough Spoiled by her brilliant position, the duchess trespassed with oo great a degree of arrogance upon her privileges. A quarrel ensued, nd they departed never to be reconiled. Mrs. Masham succeeded the uchess as confidante of Queen A., nd it can be traced chiefly to her fluence that the Whig ministry llapsed, 1710. Their leader was Godolphin, a determined sup of the Jacobites. Harley (after Earl of Oxford) and St. John (Bolingbroke) led the new mini Dissensions among them caus still greater delay in the prosecu of A.'s plans. She now wishe assure the success of her broth accession at all cost, but want of formity in the House made the ject impossible of execution. In 17 bitterly disappointed at the failur her fond hopes, A. died. She was s ceeded by the Elector of Hanov George I.

Among the notable events of h reign, most of which are treat separately, mention must be made (1) the Act of Union, 1707, whic united the parliaments of Englan and Scotland; (2) the War of th Spanish Succession, 1702–13, th chief events of which were the battle of Blenheim (1704), Ramillies (1706) Oudenarde (1708), Malplaquet (1709) and the capture of Gibraltar (1704). The war was ended by the Treaty of Utrecht, 1713.

Anne of Austria (1601–66), eldest daughter of King Philip III. of Spain; she married in 1615 Louis XIII. of France. Owing to the influence of Richelieu this marriage was one long estrangement. On the death of Louis XIII. he became regent for the young king, Louis XIV., adopting as her minister Mazarin. That she was deeply under the influence of this minister can be proved, but we have no conclusive evidence of their marriage. On his death in 1661 she retired to a convent, where she died.

Anne of Cleves (1515–57), a Ger. and Lutheran princess. Married as a fourth wife to Henry VIII. in Jan. 1540. This marriage proved unsuccessful, owing to the plain looks and dulness of the princess herself. She, however, was quite satisfied to be divorced (June 1540), and received a pension. Her marriage, however, arranged by Thomas Cromwell, was the immediate cause of his downfall and death, 1540.

Anne of Denmark (1574–1619), daughter of Frederick II. of Denmark and Norway, and wife of James I. of England and VI. of Scotland. Married in 1589 to James in spite of the opposition of Queen Elizabeth. Showed tendencies towards Catholicism, and probably for that reason was deprived of the education of the young Prince Henry. Was very extravagant and vain, but very highly esteemed by the king.

Anne of England (1456–85), daugh ter of the Earl of Warwick (the king maker). She was betrothed t Edward, Prince of Wales, but afte his death at Tewkesbury in 1471 was

compelled by Richard of Gloucester to marry him in 1473. In 1483, when he usurped the crown, she became queen.

Annealing, a process to which glass and metals are subjected, which consists of heating and subsequent gradual cooling. On the other hand, tempering consists of heating a metal and then suddenly cooling it. The result of A. is to make the material ductile and tough, whilst the result of tempering is to make it hard and brittle. The ultimate condition is probably brought about by a certain arrangement of the crystals or fibres of the material, accompanied by a degree of occlusion of gas. Glass, before it is annealed, is excessively brittle, so that a hard body like a small stone dropped into an unannealed glass vessel shivers it to pieces. For purposes where metals have to undergo any strain they have to be annealed, that is, cooled more slowly than in ordinary air, while they are being worked, or afterwards. It is found, too, that pieces of metal, such as the links of a chain, undergo changes in their molecular arrangement with lapse of time, so that it is no uncommon thing for a chain to be re-annealed after it has been in use for some time.

Annecy, cap. tn. of dept. of Haute-Savoie, France. It is situated at the N. end of the Lake of A., in a beautiful country, and contains interesting buildings. Pop. 10,800.

Annelida (Lat. *annulus*, little ring), a phylum of animals differing little from the Arthropoda and the Mollusca. It consists of segmented worms most of which bear minute spines or ...etæ by which locomotion is assisted; ...he blood is usually red, and the peri-...isceral cavity is part of the cœlome. ...he arthropods differ from them in ...o last particular, and the molluscs ... unsegmented. Usually the A. ... aquatic, but in some cases they ... terrestrial (earth-worms); some ...ies are hermaphrodite. There is a ...ular system in most As., the ner-... system consists of ganglia; ...ation is often effected by means ...s; the alimentary system con-... tubular canal opening in the ...gment as the mouth, and in ... as the anus. Reproduction ...ke place sexually or asexually ...ling; in many instances, if a ... cut in two each part will ...the missing segments. These ...enerally hide themselves by ... burrowing, but some form ...emselves a dwelling made ...ons from their bodies and ...d external material. The ... earth-worms, lob-worms, ...s, and leeches.

Annen-Wullen, manufact... Westphalia, Prussia, near ... noted for its coal mines and ... steel works. Pop. 12,000.

Annexation, the term ap... international law to the act b... a nation adds to its territorie... previously independent or in t... session of another state. It m... the result of conquest, of volu... cession, or of mere occupation... previously unoccupied or unciv... dist. Often, again, it is the sequ... the establishment of a protector... A., except in case of cession, m... always be supported with an ar... force sufficiently large to carry... proclamation into effect; otherwise... is purely fictitious. For example, ... Sept. 1900 Lord Roberts proclaime... at Pretoria that Great Britain ha... annexed the territories of the Trans... vaal republic. Yet the war continued... for another two years.

The annexing state takes over all the territory annexed, with its obligations and benefits, provided they be not contrary to the new order. Laws previously passed are, of course, no longer binding. Questions of detail are perpetually being settled in the courts of various nations, and recourse should be had to these cases for fuller information as to the practice of individual states.

Annexe, a subsidiary building as at Harvard College, U.S.A., also a literary term for added matter.

Anniston, co. seat of Calhoun co., Ala., U.S.A., among the Blue Ridge Mts., 63 m. N.E. of Birmingham. It is a centre of the cotton trade, and has large manufs. of all kinds of iron work and machinery. It is the seat of the Alabama Presbyterian College. Founded in 1873. Pop. 17,734.

Annius of Viterbo (1432–1502), whose real name was Giovanni Nanni, was a Dominican monk, and was *b.* at Viterbo and *d.* at Rome. He was famous for his knowledge of the Gk., Lat., and Eastern languages. His work, entitled *Antiquitatum Rariorum Volumina XVII.*, etc., professes to contain fragments of anct. authors, as Berosus, Manetho, Fabius Pictor, and Archilochus.

Anniversary (Lat. *anniversarium*, from *annus*, year, and *vertere*, *versum*, to turn) is a term used to express the yearly return of any remarkable day. As. of religious festivals, of the commemoration of great events in history, and of birthdays in domestic life are held. The Christians keep Christmas Day, Good Friday, Easter and Whitsun in commemoration of the great events in the life of Christ. In history the A. of the Gunpowder Plot on November 5 is kept.

Anno Bom, Annobon, or Annaben,

is a small volcanic is. in the Bight of Biafra, in the E. part of the Gulf of Guinea. It was discovered by the Portuguese in 1473, and was ceded to Spain in 1778. Pop. 2500.

Annonay, tn. of Ardèche, France. It manufs. leather (for gloves), paper, etc. Pop. about 15,000.

Annotto, a dyestuff from the *bixa orellana*.

Annual Register, pub. yearly, a record of contemporary events. It was started in 1758 by Dodsley the bookseller. It is now pub. by Messrs. Longmans, and contains information on literature, art, science, and events of the current year.

Annuals, a class of books sumptuously produced with splendid engravings very popular during the first half of the nineteenth century. They were particularly in vogue as Christmas, New Year, and birthday presents. The succession was commenced in 1823 by the *Forget-me-not*, followed in the next year by *Friendship's Offering* and the *Literary Souvenir*. Other successors are the *Keepsake*, ed. by Lady Wortley and later by the Countess of Blessington, who also ed. the *Book of Beauty*. The *Gift* and the *Token* were American productions. About 1840 their popularity declined rapidly. The *Forget-me-not* continued for the unparalleled length of twenty-two years. The *Book of Beauty* and the *Keepsake* survived it till 1856. The name, though not the genus, remains in the present Christmas A.

Annuity, a term applied to a sum of money which is paid yearly, or at certain periods of each year. The most general application of the term is in the case of what are otherwise called *life-As.*, that is, where a certain sum is paid *per annum* until the death of a stated person. *As. certain* are not dependent upon any contingency, and may be *terminable*, in which case the payments continue until a stated date, or *perpetual*, where the payments are presumably for ever. When the first payment has to be made at the time of the transaction, it is called an *A. due*, but when payment has not to commence until a stated date, it is called *deferred A.*

Examples of As. certain are pro- ded by the following. A lessor lets house at £50 per annum, and the sidue of the lease is ten years. The al amount received would be £500, t as cap. accumulates interest, that s not represent the present value he A. A capitalist lends a sum of ney to be repaid in a certain num- of years. In this case we should ect the total amount repaid to be xcess of the original amount, owing to the factor of interest. gov. uses the principle of termi As. to discharge certain obliga within a given time, with a vie limiting in some degree the bur placed on posterity by the nati debt. Such As. may be held private persons, and are exchan either for cash or for gov. st which is cancelled when the As. taken up. The gov. may also ma an arrangement with itself, as it w as a banking concern, to make pa ments to include a proportion of t cap. as well as the interest of go stock, as in the 'Old Sinking Fun The value of such an arrangement that it can be varied upon an emer gency, although, for obvious reasons such a proceeding is usually avoided if possible. Instances of perpetua As. are provided by the various irre- deemable gov. stocks, where the security is practically absolute. In calculating the present value of an A. certain, or the yearly amount for a certain purchase value, the interest reckoned is compound. Methods of calculation are to be found in any text-book of algebra.

Life-As. present some more complicated features than As. certain, because the probability of the contingency becoming actual enters into the calculation. Hence the importance of tables of mortality, etc., for insurance companies and others who deal with As. The tendency in early times was to use very simple rules for the probability of death, which were generally very inaccurate for extreme cases. Thus the rule in Rome up to A.D. 230 was to reckon for all ages under thirty an A. was worth thirty years' purchase, and for every additional year of age one year was taken off the purchase value. Thus the purchase value actually vanished at sixty years of age. In 1725 Abraham Demoivre enunciated the rule that out of eighty-six children born, one would die every year until the last one died between the ages of eighty-five and eighty-six. This was found to fit in approximately with observed facts, but continual improvements have since been made. Perhaps the same conclusion had been arrived at in 1671 by Hudde, in a correspondence with Jan de Witt, grand pensionary of Holland. It had been the custom to grant As. to persons of any age, the rate of interest being double that allowed on stock, that is, if gov. stock yielded 5 per cent. interest, As. were granted at the rate of 10 per cent. De Witt showed that As. had been granted to young lives at less than fourteen years' purchase, and he accordingly investigated, in the interests of the state, the probability of

death for persons of various age. He came to the conclusion that in each half year from the ages of three to fifty-three the probability of death is the same, that from fifty-three to sixty-three it is greater in the proportion of three to two, from sixty-three to seventy-three greater by two to one, and in the seven years from seventy-three to eighty greater by three to one. In 1693, Halley, the famous astronomer, worked out the probability of death for every fifth year from the records of birth and deaths in the city of Breslau, and computed the purchase value of As. at 6 per cent. interest, this being probably the first attempt to arrive at values on a scientific basis. Shortly afterwards the Eng. gov. attempted to raise money by the sale of As. at 14 per cent., that is to say, at about seven years' purchase. Notwithstanding the pub. tables of Halley, which showed that such As. were worth from seventeen years' purchase at age ten to four and a half years' purchase at age seventy-five, the proposal was by no means eagerly accepted by the investing public. In 1808 the Northampton table was adopted by the gov., based on statistics of the deaths in Northampton between 1735 and 1780. As. were offered on the lives of nominees, this time based on age with no distinction of sex, but at much too favourable a rate. Again little business was done except by Dutchmen, who were more conversant with the subject and chose their lives carefully, but the loss on such transactions increased until it mounted to as much as £8000 a veek. The next scheme was much nore scientifically constructed, but ncluded As. for men of ninety years f age at 62 per cent., or less than two ears' purchase. This provided an pportunity for speculators who minated all the healthy old men ey could lay their hands on and ped a rich harvest Thencefor- rd As. on aged lives were not ered, and some time afterwards it enacted that no one could nomi- e a life over sixty-five unless the inee had a direct interest in the A. aturally such experiences and gradual accumulation of reliable stics have enabled the gov. to tain what rates are profitable. gov. tables, however, are based e assumption of a 2½ per cent. st, whereas many insurance nies can afford to allow for at or 3½ per cent. interest. The in general use by the prin- ce offices are those prepared Institute of Actuaries, and are ished by the symbols H^M, ^{MF} and D^M, representing healthy male lives, healthy fema[les] healthy males and females, diseased males and females. Examples of such tables are append[ed].

TABLE I. H^M

Showing the value of an A. of £1 [at] certain ages.

Age next Birthday.	Value of an A. of £1.	Age next Birthday.	Value of an A. of £1.
20	£20·043	50	£13·896
25	21·038	55	12·094
30	19·867	60	10·236
35	18·587	65	8·418
40	17·176	70	6·657
45	15·594	75	5·061

TABLE II.

Approximate As. for a purchase price of £100.

Age next Birthday.	A. for £100 Males.			A. for £100 Females		
40	£6	0	4	£5	5	6
45	6	9	10	5	14	0
50	7	1	2	6	8	0
55	8	0	10	7	5	6
60	9	0	4	8	1	0
65	10	13	4	9	7	10
70	12	19	2	11	8	6

Annularia (Sternberg), a genus of fossil plants with leaves in whorls, from the coal formations of Europe and America.

Annulet, architectural term for a small fillet or band running round a column. *See also* term under HERALDRY.

Annulus, in geometry, the name of the space or ring enclosed between the circumferences of two concentric circles.

Annunciation, the announcement made to the Virgin Mary by the angel Gabriel of Christ's Incarnation. The Feast of the A. (commonly known in England as Lady Day) was instituted in memory of this fact. It is kept throughout the church on March 25. The highest It. order of the knighthood is that of the A. The subject has frequently been treated in sacred art.

Annunzio, *see* D'ANNUNZIO.

Annus Deliberandi, the period allowed to an heir by Scots law to decide whether he will accept or reject the inheritance, including any debts or mortgages thereon. The period has now been shortened to six months, at the expiration of which time creditors may take action.

Annus Mirabilis, the title of a poem written in 1667 by John Dryden. The title, meaning 'The Wonderful Year,' refers to 1666, in which the Eng. were victorious in the war against the

is a small volcanic is. in the Bight of Biafra, in the E. part of the Gulf of Guinea. It was discovered by the Portuguese in 1473, and was ceded to Spain in 1778. Pop. 2500.

Annonay, tn. of Ardèche, France. It manufs. leather (for gloves), paper, etc. Pop. about 15,000.

Annotto, a dyestuff from the *bixa orellana.*

Annual Register, pub. yearly, a record of contemporary events. It was started in 1758 by Dodsley the [illegible] now pub. by [illegible] contains in- [illegible] art, science, [illegible] it year.

Annuals, a class of books sumptuously produced with splendid engravings very popular during the first half of the nineteenth century. They were particularly in vogue as Christmas, New Year, and birthday presents. The [illegible] menced in [illegible] followed in [illegible] *ship's Off* [illegible] *Souvenir.* [illegible] *Keepsake,* [illegible] later by th[illegible] who also [illegible] The *Gift* and the *Token* were American productions. About 1840 their [illegible] apidly. The [illegible] for the un- [illegible] ty-two years. [illegible] id the *Keepsake* survived it till 18[illegible]. The name, though not the genus, remains in the present Christmas A.

Annuity, a term applied to a sum of money which is paid yearly, or at certain periods of each year. The most general application of the term is in the case of what are otherwise called *life-As.*, that is, where a certain sum is paid *per annum* until the death of a stated person. *As. certain* are not dependent upon any contingency, and may be *terminable*, in which case the payments continue until a stated date, or *perpetual*, where the payments are presumably for ever. When the first payment has to be made at the time of the transaction, it is called an *A. due*, but when payment has not to commence until a stated date, it is called a *deferred A.*

Examples of As. certain are provided by the following. A lessor lets a house at £50 per annum, and the residue of the lease is ten years. The total amount received would be £500, but as cap. accumulates interest, that does not represent the present value of the A. A capitalist lends a sum of money to be repaid in a certain number of years. In this case we should expect the total amount repaid to be in excess of the original amount, owing to the factor of interest. The gov. uses the principle of terminable As. to discharge certain obligations within a given time, with a view to limiting in some degree the burdens placed on posterity by the national debt. Such As. may be held by private persons, and are exchanged either for cash or for gov. stock, which is cancelled when the As. are taken up. The gov. may also make an arrangement with itself, as it were, as a banking concern, to make payments to include a proportion of the cap. as well as the interest of gov. stock, as in the 'Old Sinking Fund.' The value of such an arrangement is that it can be varied upon an emergency, although, for obvious reasons, such a proceeding is usually avoided if possible. Instances of perpetual As. are provided by the various irredeemable gov. stocks, where the security is practically absolute. In calculating the present value of an A. certain, or the yearly amount for a certain purchase value, the interest reckoned is compound. Methods of calculation are to be found in any text-book of algebra.

Life-As. present some more complicated features than As. certain, because the probability of the contingency becoming actual enters into the calculation. Hence the importance of tables of mortality, etc., for insurance companies and others who deal with As. The tendency in early times was to use very simple rules for the probability of death, which were generally very inaccurate for extreme cases. Thus the rule in Rome up to A.D. 230 was to reckon for all ages under thirty an A. was worth thirty years' purchase, and for every additional year of age one year was taken off the purchase value. Thus the purchase value actually vanished at sixty years of age. In 1725 Abraham Demoivre enunciated the rule that out of eighty-six children born, one would die every year until the last one died between the ages of eighty-five and eighty-six. This was found to fit in approximately with observed facts, but continual improvements have since been made. Perhaps the [illegible] rrived at [illegible] respond- [illegible] pension- [illegible] been the custom to grant As. to persons of any age, the rate of interest being double that allowed on stock, that is, if gov. stock yielded 5 per cent. interest, As. were granted at the rate of 10 per cent. De Witt showed that As. had been granted to young lives at less than fourteen years' purchase, and he accordingly investigated, in the interests of the state, the probability of

Dutch, and in which the Great Fire of London occurred.

Anoa, a species of ruminating quadruped apparently intermediate between the antelopes and the ox or bovine group. It is about the size of a sheep; is wild and fierce; and its horns are erect, straight, sharp, depressed anteriorly, and irregularly ranged at the base. It is found in large herds in the is. of Celebes.

Anobium is a genus of coleopterous insects. It consists of small beetles which live on organic matter. *A. paniceum* is the biscuit weevil, and *A. striatum* the death-watch, which makes a curious tapping sound.

Anode, in electrolysis (*q.v.*), the electrode in connection with the positive pole of the battery. The direction of the current is from the A. through the liquid to the kathode.

Anodynes, or Analgesics, medicines which relieve pain by their action on the brain, or their influence over the conductivity of the sensory nerve

cept in accordance with the advice of a medical man. *Hoffman's A.* is a colourless liquid consisting of ether, alcohol, and ethereal oil; it is used in nervous irritation, angina pectoris, and asthma. *A. colloid* is an unofficial remedy used for painting over the course of nerves in neuralgia, sciatica, etc.

Anointing, *see* Baptism, Chrism, Coronation, Extreme Unction.

Anolis, a genus of lizards belonging to the Iguanian family (*see* Dumeril and Bibron's work on *Reptiles*, vol. iv. p. 85), and peculiar to America and the adjacent islands. The structure of their toes enables them to traverse a smooth wall or ceiling, and to climb with great facility. They are slender, active, and for the most part of small size, and are mostly found in woods and rocky places. They are timid and harmless, and when under the influence of fear they dilate the dewlap, and the skin especially of the throat changes its hues with great rapidity.

Anomalina (D'Orb.), one of the many genera of Foraminifera (Fossil) which occur in Tertiary strata.

Anomalistic Year, the period of time betwee
of the earth
point in its
nearest the sun. This point is not fixed, and as a result the A. Y. is nearly five minutes longer than the sidereal.

Anomaluridæ, an African rodent closely allied to the flying squirrels, but forming a distinct genus by reason of the horny scales on the lower surface of the tail. These project from the skin and probably assist the animal in climbing trees.

Anomaly (Gk. ἀν, negative, ὁμαλός, even), a variation from the ordinary rule. In astronomy the angle subtended at the centre of the sun by a planet in any part of its orbit and the perihelion it has passed. The *mean A.* is that which would be true if the body moved at a uniform rate throughout its course, the rate being calculated from the actual time taken.

Anomodontia, a div. of extinct reptiles found in various parts of Europe, Asia, Africa, and America. They were purely terrestrial, had many mammalian characteristics, and varied greatly in size.

Anona is a genus of tropical plants of the order Anonaceæ. The fruit consists of berries which unite with the receptacl
edible mass.
sop, *A. mur*
reticulata the custard-apple.

Anonaceæ, an order of dicotyledonous plants consisting of tropical and sub-tropical trees and bushes. The flowers have a perianth in three whorls of three, numerous hypogynous stamens, and numerous superior carpels, usually with many ovules. The genera *Anona* and *Artabotrys* have edible fruits, while the species *Uvaria aromatica* yields Æthiopian pepper.

Anonymous (Gk. ἀν, negative, ὄνυμα, dialect, name), a writing or work of which the author is not named. The work is described as *pseudonymous* when an assumed name is used. Most of the works of art of antiquity which have come to us are A., and in past centuries many great writers have pub. their works in this form. Swift's *Tale of a Tub*, etc., and Goldsmith's *Citizen of the World*, may be cited as examples of works pub. thus, from the authors of which the veil has afterwards been withdrawn. The author of the *Imitation of Christ*, a book circulated throughout the world, is yet unknown. Most journalistic essays were until comparatively late years pub. anonymously, as concealment was felt to give greater freedom to the writer. It has frequently, however, been made a cover for little more than personal spite. Anonymity forms one of the greatest difficulties of bibliography. The titles of some 24,000 A. works are given in Barbier's *Dictionnaire des ouvrages anonymes et pseudonymes* (Paris, 4 vols., 3rd edit. 1872–9). Similar works of reference are Halkett and Laing's *Dictionary of Anonymous and Pseudonymous Literature* (Edinburgh, 1881–8), Cushing's *Anonyms* (Cambridge,

contains the goose (*q.v.*). *A. cinereus* is the grey goose, *A. hyperboreus* the snow goose, *A. segetum* the bean goose.

Ansgar, Anscharius or Ansgarius, St. (801–65), 'The Apostle of the North,' was *b.* in Picardy and *d.* in Bremen. He went as a missionary first to Denmark, and then to Sweden. In 831 he was made archbishop of Hamburg, and the see was transferred to Bremen in 847. Among his works are some essays and a *Life of St. Willehardi*. *See* Rimbert, *Vita S. Anskarii*; Pertz, *Monumenta Germaniæ Historica*, vol. ii.; Tappehorn, *Leben des Heil. Ansgar*, Münster, 1863.

Anshelm, Valerius, Ger. physician and author of early sixteenth century. He practised in Bern from 1509, and in 1529 wrote the *Berner Chronik*, a history of the city largely based on original documents. He is especially valuable on the Reformation, of which he was an ardent supporter. An edition in 6 vols. was issued by Stierlin, 1825–53. A. *d.* in 1540.

Anson, George, Lord (1697–1762), a famous Eng. admiral and circumnavigator of the world, was *b.* at Shugborough in Staffordshire. In 1712 he entered the navy, and by 1724 had reached the rank of Captain. In 1740, during the war with Spain, he was made commodore of the S. American squadron, and though the expedition was hopelessly mismanaged, his indomitable perseverance earned some success. *See* his *Voyage Round the World*.

Anson, Sir Wm. Reynell (1843–1914), notable English jurist, *b.* at Walberton, Sussex. In 1874 became Vinerian reader in English law at Oxford. In 1899 was returned as Liberal-Unionist M.P. for the University. In 1902 became Parl. Secretary of the Board of Education. He pub. *Law of Contract*, *Law and Custom of the Constitution*.

Ansonia, city of New Haven co., Connecticut, U.S.A., on the R. Naugatuck. Manufs. brass, copper, hardware, clocks, etc. Pop. 19,898.

Ansted, David Thomas (1814–80), vas educated at Jesus College, Camridge, appointed professor of geology t King's College, London, in 1840, nd lecturer to the Addiscombe Indian ilitary school and the Putney ngineering college in 1845. His orks, both technical and popular, geology, were numerous and able.

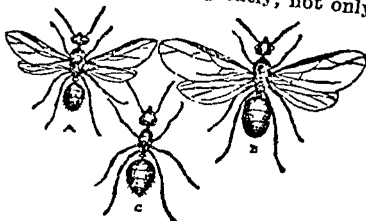
Anstey, Christopher (1724–1805), a untry gentleman, was educated at ng's College, Cambridge. His *chef euvre* was the *New Bath Guide*, poem published in 1766. This irical sketch of Bath life made a ided hit at the time, and is enthustically praised by both Gray and Walpole in their correspondenc None of his other works attain th standard of the *New Bath Guide*.

Anstey, F., is the *nom-de-plume* o Thomas Anstey Guthrie (*b.* Aug. 8 1856), a novelist of a clever and humorously fantastic imagination. He was educated at King's College School, London, and Trinity Hall, Cambridge. He made a big success with his first book, *Vice Versâ*, which he has followed up by *The Fallen Idol*, *The Tinted Venus*, *The Talking Horse*, *Travelling Companions*, *Baboo Jabberjee*, *Paleface and Redskin*, *Love among the Lions*, *The Brass Bottle*, and *The Man from Blankley's*.

Anstruther, seaport on the Firth of Forth, Fifeshire, Scotland, composed of the two royal burghs, Easter and Wester Anstruther. Fishing and fish-curing are the main industries. It is the bp. of the poet Tennant and Dr. Chalmers. Pop. 1588.

Answer, *see* PLEADINGS.

Ant (Old Eng. *amete*; A.-S. *æmete*: Ger. *ameise*, from Old High Ger. *meizan*, to cut), *emmet*, or *pismire*, an insect of the family Formicidæ (Lat. *formix*, ant) of the order Hymenoptera, to which also belong the wasp and the bee. They are social animals of many genera and about 2000 species; they vary greatly, not only



ANTS

A, male; B, female; C, worker

among the various genera, but also among the individual species. The *white As.* (termites) are often thought to belong to the A. family, but they are in reality members of the order Isoptera, and though in habit and construction of their homes they somewhat resemble As., they are not related morphologically.

As. are omnivorous, feeding on both vegetable and animal life, when alive and when dead. The harvesting As. (*Aphænogaster*) store up grain for food, the leaf-cutting As. (*Atta*) completely denude trees and store the leaves in their nests for the sake of a fungus which will grow on them; other As. are cannibalistic. All delight in saccharine matter, and it is on this account that they keep their

cows, i.e. aphides, which excrete a sweet substance, seen on plants as *honey-dew*.

The queen A. is the greatest in size, and in her nest there will be males, females, and neuters, or aborted females. Sometimes both male and female are winged, sometimes winged and wingless live together. Among neuters the *soldiers* have larger heads than the mere ordinary *workers*, and these defend their home when it is attacked. Both workers and fertile females have stings, and the poison they eject is known as *formic acid*. The male A. is usually smaller than the female. In the colony occasionally beetles and smaller As., as the *Formica rufa*, live peacefully, and are thought to take the place of domestic pets. Mating takes place between winged As. when in flight; the male soon after perishes, and the females which escape such perils as drowning and insectivorous birds tear off their wings and perform their new rôle. They either go voluntarily to a nest to lay their eggs, or are dragged to one by workers who will attend to the needs of the young. Occasionally the females found a new colony without the workers, performing all the work alone until the first brood is hatched; as this consists of workers, the female does not long pay attention to the eggs. The workers carry the eggs from one part of the nest to another as the temp. requires, the nest consisting of irregular cells connected by passages. The larvæ are fed on semi-digested food by the workers, and when they grow older some species form cocoons; even in the pupa stage the workers feed them, and when the time is ripe for their entrance into the world, they help them to extricate themselves from their cases and lick them over when they are free. Some As., as the *F. sanguinea* and the genus *Polyergus*, make slaves of other As., and in some instances are unable all through life to feed themselves, actually depending on their slaves to put the food into their mouths.

[illegible]s. are usually very short-lived. [illegible] queens may last for sev. years, the ordinary As. usually endure only one summer; the workers [illegible]ve in winter by hibernation. [illegible] intelligence of As. is a disputed [illegible]ct, but they are known to show [illegible] of excitement at the return of [illegible]ved companion or on the ap[illegible] of the queen, and they recog[illegible] members of their own species [illegible] have entered other nests. The [illegible]s of some species are almost [illegible]s, but As. have the power of [illegible] enemies. They communicate [illegible] each other seemingly by means of their antennæ, and by stridul[illegible] organs of the abdomen. They [illegible] great care of the sanitation of [illegible] nests, removing the dead and all [illegible] necessary objects immediately. [illegible] nests are frequently mounds of ea[illegible] and leaves, but often are found [illegible] neath stones. An Australian A., *Myrmecia*, builds enormous moun[illegible] and a S. American A. forms hills [illegible] or 6 ft. in height. *See* Sir John Lu[illegible] bock's *Ants, Bees, and Wasps*, 188[illegible] J. T. Moggridge's *Harvesting Ant*[illegible] 1873; F. White's *Ants and Thei*[illegible] *Ways*, 1883.

Antacids, in medicine, substances which have the power of neutralising or counteracting acids in the gastric juices or excreta. The most important are caustic soda and potash, with their carbonates, bicarbonates, acetates, and citrates; ammonia and magnesia, with their preparations. Some of these, like soda, act directly upon the gastric membrane; others, like the acetates and citrates, act indirectly through the blood, being converted into carbonates. The direct A. are used in dyspepsia, where it is required to counteract the excessive acidity of the stomach; and the indirect in gout, where the excess of uric acid in the blood is to be counteracted.

Antæus, son of Poseidon and Gea, was a Libyan giant of Gk. mythology who was invincible at wrestling until overcome by Hercules.

Antagonist Muscle, one which acts in direct opposition to another which is attached to the same part. The flexors are antagonists of the extensors. Congener muscles are those which produce the same movements.

Antalcidas was a Spartan soldier and diplomatist, who succeeded in undermining the friendly relations between Athens and Persia in the fourth century B.C., and who later, by his naval operations in the Hellespont, forced Athens, in 386 B.C., to accept the Peace of A. By this treaty all Asia Minor was to be under Persian rule, and all the Gk. cities, except Lemnos, Imbros, and Scyros, became independent.

Antalkalis, substances which neutralise alkalis, such as acids.

Antalo, a tn. and plain in the Tigré dist., Abyssinia. In some parts of the plain agriculture is followed.

Antananarivo, or Tananarive, the cap. of Madagascar, situated on a hill in the interior of the is. It contains an observatory, a cathedral, a royal palace, gov. buildings. Pop. [illegible]

Antar, an Arabian warrior and poet of the sixth century. He was one of the poets whose works were called 'Moallakat,' and the hero of a romance, trans. into Eng. by [illegible] Hamilton 1819. This romance gives

a description of the manners and customs of the Bedouin Arabs.

Antarctic Ocean and Exploration. Until the eighteenth century the A. regions existed in human imagination as a great continent extending into temperate latitudes; but though, unlike the Arctic regions, the A. consists largely of land, as was established before Cook's voyage of 1774, it was certain that such southward land as might exist only extended beyond the A. circle in one place—to the S. of S. America. Since Cook's voyages no new land has ever been found S. of the A. circle, apart from the southward extension of what may be the E. coast of Graham Land (60° W.), but it has been fairly clearly established since the year 1900 that the A. regions consist of a continent extending N. and S., over an area one and a half times greater than that of Europe, completely cut off from the rest of the world by the A. Ocean. Various explorers have touched the N. limits of this continent at King Edward VII. Land, Victoria Land, Wilkes Land, Budd's High Land, Kaiser Wilhelm Land, Enderby Land, Cotes Land, and Graham Land, the great masses of pack ice between the last and first named leaving the line of the continent conjectural between 70° W. and 15 W. Antarctica or the A. Continent appears to be an ice-clad mountainous continent crowned by a vast glacial table-land. Between King Edward VII. and Victoria Lands extends the Great Barrier, an ocean ice-cap of great extent and stupendous thickness, covering perhaps nearly 200,000 sq. m. of the A. Ocean, and apparently ending in a bight in 86° S. The glacial covering of Antarctica stretches N. and S. for over 1000 m. and covers an area of perhaps 5¼ million sq. m. The glacier-covered plateau within 100 m. of the Pole was found by Sir Ernest Shackleton to be 11,000 ft. in altitude in 88° . 162° W., the average elevation of the continent being about 6500 ft. ountain peaks discovered by nundsen in 164° W. 85° S. were und to attain a height of 15,000 ft. e South Pole Plateau itself is estimated to be nearly 11,000 ft. high. ive volcanoes have been seen in ham Land and Victoria Land, the hypothesis of earthquakes is nference from the great increase ne amount of drift-ice from the A. the size of the bergs observed in -96. The N. limit of the pack appears to lie along 60 S. in summer, ts winter latitude is unknown. lepth of the A. Ocean varies considerably. From the neighbourhood rra del Fuego to Kerguelen Is. bout 2500 fathoms. Round the Pole at 60° S. it is over 2000 fathom while E. of Victoria Land it var from 200 to 800 fathoms. Submari ridges rise up at Graham Land about 100 fathoms of the surfac Borchgrevink assigned to the mag netic pole the position of 73° 20' S and 146° E., but the local attraction of volcanic rocks and magnetic storm made his observations erroneous, and Professors Mawson, Mackay, and David have subsequently located it with more probability at 72° 25' S. 155° 16' W. on the inland ice some 7000 ft. above sea-level. The summer climate of the A. R. has long been recognised as cold and ungenial, but the presence of coal seams within 300 m. of the Pole points to a former milder climate conducive to extensive vegetation even at the Pole itself, though late discoveries now establish Antarctica as being barren of all terrestrial life except that of the lowest microscopic organisms. Generally speaking, the summers are remarkably cold, the winters not extraordinarily so. There is evidence of a permanent S. Polar anti-cyclone, and terrific storms of wind and a succession of cyclones prevail in the vicinity of Victoria Land, and indeed the N. side of the A. is recognised as the windiest part of the world, records showing that for some months the average wind velocity is 50 m. an hour. The fall of snow and rain observed is estimated to be equivalent to an annual rainfall of about 30 in. The flora of Antarctica appear to be limited to a few species of lichens and reindeer moss found on Victoria Land and in the Palmer Archipelago, though the *Belgica* expedition discovered mosses and grass on the shores of Belgica Strait off Graham Land. The fauna comprise different species of seals, penguins, petrels, skua; of insect life, diptera with rudimentary wings, minute acarides; and of marine life a great number of species representing plankton, littoral forms, and benthos. There appear to be no right whale (or Greenland whale), walrus, or narwhal, and no land mammals.

The history of A. exploration may be said to begin with Captain James Cook's voyages in the *Resolution* and *Adventure*, 1772–75, though Bouvet, Dalrymple, and others had done something to dispel the illusion of a S. Atlantic continent stretching to tropical latitudes.

It is impossible here to describe in any detail the voyages prior to that of the *Challenger* under Nares in 1874, but Ross in H.M.SS. *Erebus* and *Terror* discovered and explored Victoria Land (1839–43), naming numerous islands and capes. The *Challenger* in 1874, commanded by Nares, was

the first steamer to cross the A. circle, but though Nares went only to 66° S. southward of Kerguelen Is. the marine flora he collected and his recorded soundings and other information enabled Sir John Murray to draw numerous valuable inferences as to the existence and trend of an A. continent. The circle was not again crossed until 1893, when Evensen in the *Hertha* sighted Alexander Land, reaching 69° 10′ S. in 76° 12′ W. In 1894 Christensen reached 74° S. at Coulman Is., finding that the sea was easily navigable to the S. Landing near Cape Adare, his party were the first people to set foot on what is generally believed to be the A. continent. In 1898 funds were raised to organise the expedition of the *Belgica*, which in January of that year left Staten Is. for the A. The geographical results were poor so far as land discovery or penetration towards the Pole are concerned, but soundings established the existence of a continental shelf of great breadth connected with land to the S. In 1900 Mr. Borchgrevink with his party of the *Southern Cross* landed on Possession Is. and on the mainland at the base of Mt. Melbourne. With the aid of sledges and dogs he advanced S. to 78° 50′. The next year the *Discovery*, equipped under the supervision of Sir Clements Markham, under the command of Commander R. F. Scott, R.N., left Cowes with Lieutenant (later Sir Ernest) Shackleton, Dr. Wilson, and others on board. This expedition during 1901–4 discovered King Edward VII. Land, a vast stretch of the austral continent reaching from 152° to 157° E.; ascended the glacial ice-cap of Victoria Land, touching, after a 300 m. journey, an altitude of over 9000 ft. in 77° 39′ S. 146° E. The work of this expedition, together with the contemporaneous voyages of Nordenskiold, who explored Palmer Land, and of the German expedition under Drygalski, and the somewhat later journey of Dr. Charcot in 1904 to W. Palmer Land, confirmed the theory of the existence of an A. continent, and which, until Bruce discovered Coats Land in 74° S. 24° W., directly opposite S. Victoria Land, had begun to be disbelieved. In 1908–9 Sir Ernest Shackleton carried out the brilliant scientific, geodetic, and geographical discoveries which earned for him his knighthood. He travelled nearly 2000 m., and ascertained the nature and extent of the Great Barrier and reached a glacier-capped plateau of 11,000 ft. elevation in 88° 23′ S. 162° W. approaching within 100 m. of the Pole. After the expedition of Mawson above alluded to, Captain Scott in 1910 set out on his tragic second journey to the Pole. In the meanwhile Amundsen, the celebrated North Pole Explorer, wintering on the Great Barrier in 1911, reached the Pole on Dec. 16, 1911, having followed 164° W. to the mountain range in 84° S., and thence, crossing the Devil's Glacier, traversed the S. Polar plateau. Scott also reached the Pole, only to find when he did so that Amundsen had preceded him. (*See* SCOTT, ROBERT FALCON.) In Jan. 1913 Lieut. Filchner, in command of a Ger. expedition, reported the discovery of Prinz Luitpoldland and Kaiser Wilhelm II. Barrier. Later information concerning A. R. is that of Dr. Mawson, who set out in the *Aurora* in 1911 with Dr. Mertz to gain additional knowledge of those lands which lie close along the arc of the A. circle due S. of Australia between S. Victoria Land and Kaiser Wilhelm II. Land (where the *Gauss* Ger. expedition had its winter quarters in 1902–3), a tract which had scarcely been touched since the voyages of Balleny, Wilkes, and D'Urville. Dr. Mawson has done much to delineate the A. plateau from the N., and the installation nearly twenty years ago of two wireless stations in communication with the Government Meteorological Office of Australia on lands never before sighted, proved of great value as a means of warning ships, and agriculturists and others, especially in Australia, of the approach of blizzards and storms.

No explorer has yet crossed the A. continent. Shackleton in 1914 proposed to make the attempt, as did Bruce in 1908, but the expense involved in such an expedition was prohibitive. It is regrettable that public support is not generous where an appeal is made solely to promote scientific research. Hence it is the better opinion that some concession must be made to the popular prejudice in favour of an effort that may be at once spectacular and utilitarian. (Consult *The Polar Regions* by R. N. Rudmore Browne.) At the end of 1928 Commander (now Rear-Admiral) Byrd headed an American expedition for a comprehensive exploration of the A. continent, and since establishing a base in the Bay of Whales, has made aeroplane flights. The scientific results of this expedition are not yet fully known (1930); but the famous airman-explorer took some wonderful pictures during his flight over the South Pole, and it is believed that his expedition has brought back much scientific detail concerning meteorology, geology, etc., never before obtained. Meanwhile the British Colonial Office, through the

'Discovery Committee,' has organised whaling research expeditions in these waters in the wooden boat *Discovery* and the new steel boat *Discovery II*, which set out in 1930. The main objective of these expeditions is the utilitarian one of checking the threatened disappearance of the whale as a commercial asset by supplementing our existing knowledge of the migrations and breeding of whales. At the end of 1928 Sir Hubert Wilkins, using Deception Island as a base, flew over Graham Land, and proved that it was not part of the main mass of the A. continent. (Consult also A. W. Greely, *The Polar Regions in the Twentieth Century*.)

Antares, the name of a bright star, Alpha Scorpio.

Ant-bear, the popular name of the *Myrmecophaga jubata*, is also known as the Great Ant-eater (*q.v.*).

Ant-catcher, the ant-thrush or ant-bird of Old and New Worlds.

Ant-eaters, popular name for members of the mammals known as Myrmecophagidæ of the order Edentata, peculiar to S. America. It is toothless, its head being prolonged into a long snout containing a protrusible tongue always well moistened with saliva, with which it picks up the ants and termites on which it feeds. The body is about 4 ft. long, and the bushy tail, which serves as protection against cold, about 2½ ft. As it walks it bends its long and sharp claws beneath it, but it can use them in its defence. It produces one offspring at a birth. *Myrmecophaga jubata* is the great ant-eater, also known as the ant-bear or tamanoir; the *Tamandua* and *Cycloturus* are other species.

Antecedent: 1. In grammar, the substantive to which a relative refers. 2. In logic, (*a*) the first of two propositions in an enthymeme, or argument of two propositions. The second proposition is called the 'consequent,' .g. in 'Every man is mortal; therefore every king is mortal,' 'Every an is mortal' is the A., and 'every ng is mortal' is the consequent.) The conditional part of a contional or hypothetical proposition, . in 'If luxury prevails, kingdoms st decay,' 'If luxury prevails' is A. 3. In mathematics, the first he two terms of a ratio. Thus in proportion, 2 : 4 : : 8 : 16, 2 and re As., and 4 and 16 are conuents.

ntecedentia. When a heavenly moves contrary to the order of signs of the zodiac—from Gemini aurus, from Taurus to Aries, etc. s said to move 'in antecedentia.' n it moves according to the order of the signs, it is said to move 'in consequentia.'

Antediluvian (Lat. *ante*, bef *diluvium*, flood), a word used in spe ing of anything which existed bef the Flood. In palæontology it is used with the biblical significance, science does not recognise an univers Flood, but with the sense of havi existed before the transformation the earth by water. in which connetion, however, it is to be noted tha recent excavators at Ur and Kish, i Mesopotamia, have found proofs o a flood having occurred there and that the inhabitants after it differed from those who preceded it. The ten antediluvian patriarchs were Adam, Seth, Enos, Cainan, Mahalaleel, Jared, Enoch, Methuselah, Lamech, and Noah. The term is now used generally in irony.

Antefixæ (Lat. *ante*, before, *fixæ*, fixed), blocks with vertical fronts placed along over a cornice in classical buildings to hide the ends of the joint tiles. They were usually ornamented with a flower, leaf, head, or group of figures. The word was also applied to small bas-reliefs ornamenting friezes.

Antelope, a name applied to many ungulates of the order Artiodactyla. It is most properly used in speaking of the *Antilope*, or Indian black-buck, but it is often used in connection with the *Antilocapra*, N. American prong-buck, or prong-horned A., which constitutes in itself the family Antilocapridæ and is the sole species. As. are however, confined to the family Bovidæ, which do not shed their hollow horns; the Antilocapridæ, however, shed their horns, which are branched. Among the Bovidæ are included sheep, goats, and oxen, and the As. may almost be regarded as any of the animals which cannot be considered as any of these. They are graceful creatures living in the plains (exceptionally on mountains, *e.g.* chamois), have rounded or lyrate horns present in all males, though not in all females, and generally there is a curious tear-gland filled with waxy matter beneath the eyes. They are found in Europe, Asia, Africa, and America, but are totally absent in Australia; in many cases reckless hunting has practically exterminated genera which were extremely numerous. They are dependent on their swift flight for their safety, as their horns provide small means of defence. Among the numerous animals grouped under the term A. are the gnus, elands, hartebeests, addax, klipspringers, chamois, gazelles, chirus, pallas, saigas, nilgais, and koodoos; the blessboks, duikerboks, blackbucks, springboks, water-bucks, bonteboks, reedbucks, gemsboks,

steinbocks, grysboks, bushbucks; the royal, sable, roan, equine, Baker's, and harnessed As.

The royal A., or *Neotragus*, includes only one species, and the females are hornless; it is about the size of a hare. The sable, roan, equine, and Baker's



KOODOO

As. belong to the genus *Hippotragus* (with the extinct blaubok), and greatly resemble the addax; they are large animals, and both males and females carry long horns. The harnessed As. constitutes the genus *Tragelaphus*, to which the bushbucks belong; they are the largest of the As., usually only the males have horns, their faces are marked, and their beautiful bodies are striped as if they bore harness. For characteristics of the gnus, elands, etc., see under their respective headings. Consult P. L. Sclater and O. Thomas, *The Book of Antelopes*, 1894–1900; W. H. Flower and R. Lydekker, *Introduction to the Study of Mammals*, 1891.

Antennæ (Lat. *antenna*, a sail-yard), popularly known as *horns* or *feelers*, are the anterior appendages (marked *a* in illustration) on the heads of some Arthropods, namely, the crustaceans, insects, and myriapods. In insects there are always two, but crabs and lobsters have four or more. They vary greatly in length, form, and comparative thickness, and may have over one hundred joints; they form tubes consisting of auditory, sensory, and olfactory nerves.



Antenor: 1. Athenian sculptor of sixth century B.C. He made the bronze figures of Harmodius and Aristogiton, which were carried away to Persia by Xerxes in 480 B.C. They were restored to Athens by Alexander the Great. 2. In Gk. legend, the wise Trojan who advised that Helen should be sent back to her husband, and advocated peace. There is a legend that he betrayed Troy to the Gks., and others that he founded another city on its site, or migrated to Cyrene. or founded Patavium.

Antequera, a tn. in Malaga prov., Spain, on l. b. of the Guadaljorce. Held by the Moors from A.D. 712 to 1410, and has among its antiquities a Moorish castle and walls. Trade in oil and fruit, and some manufs. of silks, leather, etc. Pop. 32,000.

Anthelia (Gk. ἀντί, against, ἥλιος, the sun), a phenomenon observed by a person whose shadow is cast upon a moist surface, such as a cloud, fog, or dewy grass; around the shadow are sev. concentric rings, luminous and coloured, shading into white at the edge.

Anthelmintics, medicines which destroy or cause the expulsion of worms, as santonin for the round worm; kousso, kamala, male-fern, turpentine, areca-nut, and pomegranate for the tape and broad worms; injections of salt, tannin, quassia, alum, iron, etc., for the thread worm; and thymol for *Ankylostoma duodenale*.

Anthem, a shortened form of 'antiphon,' is a musical composition set to sacred words and used in the service of the church since Elizabeth's reign. It was first written for alternate parts, but may now be written for solo, soli, or chorus, or a combination of all three.

Anthemis, a genus of the Compositæ, of which the British species are known as *chamomile*; they possess medicinal properties. *A. arvensis* and *A. nobilis* grow in fields and on commons. *A. tinctoria* is used in France for a yellow dye.

Anthemius (*d.* c. 534), Gk. mathematician and architect, *b.* at Tralles in Lydia. He began the rebuilding of St. Sophia in Constantinople for Emperor Justinian, the church having been destroyed by fire in 531; it was completed by Isidorus of Miletus in 537. He wrote sev. mathematical treatises, and he is credited with the invention of domes. See *Mémoires de l'Académie des Inscriptions*, 1786.

Anther is a term applied to the pollen-bearing body at the tip of the filament of a flower. It is united to the filament by means of a *connective*; and A., filament, and connective form the stamen. The A. consists of two A.-lobes, sometimes of one, which contain the four pollen-sacs, which burst open when ripe to free the pollen. It is said to be *versatile* if it

swings on the filament, *dorsifixed* if immovable. In some plants, *e.g.* daisy and potato, the As. cohere, while the filaments are free; this is called the *syngenesious* or synantherous condition.

Antheridium (Gk. ἄνθος, flower, εἶδος, shape) is the male sexual organ found on the prothallus of certain plants (*see* ARCHEGONIATA), as the archegonium is the corresponding female sexual organ. It is a capsule containing spermatocytes which give rise to spermatozoids.

Antherozoid, the male element or cell in the sexual reproduction of the lower plants. It is usually a freely moving spermatozoon, and is attracted towards the female cell, when it approaches within a certain distance of it, by a chemotactic action of the latter.

Anthianus Furius, a Rom. jurisconsult, whose dates are unknown. In the *Digest* are three excerpts from his work *Ad Edictum*, on the Edict.

Antholithes (Gk. ἄνθος, flower, λίθος, stone), fossil plants occurring in the coal formations of Shropshire and Northumberland. Lindley gave them their name, and Hooker considered them to be flower-spikes.

Anthology, a compound Gk. word, used metaphorically, which means literally a 'collection of flowers.' This title is applied to a work which is a collection of select extracts or choice passages from various branches of literature, but more generally the term is restricted to collections of short or lyrical poems. Most countries have their poetic As., Asiatic literature being extremely rich in them. From Turkey to Tartary, from Persia and Arabia, on through India to China and Japan one finds these caskets of the gems of national literature. The Psalms of David and the Proverbs of Solomon are veritable Hebrew As. To Confucius is attributed the compilation of the Chinese *Shi-King* (Book of Songs), and it is claimed for it that it is the oldest A. in the world. Rückert pub. Ger. translation of it in 1833, and s countryman, Von Hammer-Purgall, rendered in 1818 a similar serce by introducing the West to rsian literature. By far the most portant A. is the Gk. A. The t collection of Gk. poems, called *Stephanos* (Garland), was made Meleager, a Syrian born at Gadara an uncertain date, but probably ut the end of the second century. It included poems by forty-six s, among them being Sappho, as is not an uncommon thing in -their compilers being but human ew poems by the editor. This was added to by succeeding editors, whose MSS. have been the earliest and fullest of the ext versions being that of Constanti Cephalas, a grammarian who flo ished in the middle of the tenth c tury A.D. It contained excerpts fr more than 300 poets, and the poe ranged from the sixth century B.C. the tenth century A.D. Early in th fourteenth century Maximus Planude laid violent and clumsy hands upo this beautiful collection of Cephalas abridging, rearranging, and eve altering. For 300 years his wa the only Gk. A. known, but in 1606 Salmasius rediscovered the A. of Cephalas in the library of the Counts Palatine at Heidelberg. A good ed. of this is Dübner's. There was no A. among the anct. Roms., and it was not until 1573 that Scaliger pub. in Leyden an imitation of the Gk. A. under the title *Catalecta Veterum Poetarum*. Other editors of Lat. As. are Pithöus (Paris, 1590) and Peter Burmann (Amsterdam, 1759 and 1773). That of Riese (1870) contained nearly a thousand poems. Eng. verse from the Elizabethan poets down to Wordsworth has been collected in F. T. Palgrave's *Golden Treasury*. By many this is regarded as the standard Eng. A., and undoubtedly as a pioneer in this field it may be said to have influenced its successors. Being a pioneer, it had some of the drawbacks of a pioneer, chief among them being its smallness of compass, only 288 numbers being included in its first edition. *The Oxford Book of English Verse* is ed. by Sir A. T. Quiller-Couch, who has profited by the mistakes of his predecessor, and in it are included many beautiful numbers the omission of which by Palgrave is difficult to account for. Such omissions included Coleridge's *Kubla Khan*, Keats' *Ode on a Grecian Urn*, both of which find place in the *Oxford Book*. The range of the *Oxford Book* is from 1250 down to 1900 in strict chronological order of birth. It thus includes Chaucer, which was a conspicuous omission from the *Golden Treasury*, and has 228 numbers in the nineteenth century. The total number of poems is 883. Other Eng. As. are Trench's *Household Book of Poetry*, A. H. Miles' *Poets and Poetry of the Century*, Mr. Bullen's *Lyrics from the Elizabethan Song Books*, Gleeson White's *Ballades and Rondeaux*, and W. B. Yeats' *Book of Irish Verse*.

Antholysis, in botany, the retrograde metamorphosis of a flower, whereby parts normally united become separated—the organs are usually multiplied. The separate parts may or may not alter in character. The condition throws light on the affinity of parts of the flower with the leaf.

Anthon, Charles (1797–1867), American classical scholar, was *b.* in New York. He was called to the bar in 1819, appointed adjunct professor of anct. languages in Columbia College in 1820, and principal professor in 1835. He ed. Lemprière's *Classical Dictionary* in 1841 and compiled a *Dictionary of Greek and Roman Antiquities* in 1843.

Anthony, Saint, *see* ANTONY, SAINT.

Anthony, St., Falls of, *see* MISSISSIPPI.

Anthony, Susan Brownell (1820–1906), American reformer, *b.* at Adams, Mass., of Quaker parents, and taught in a New York school from 1835 to 1850. She was a zealous agitator for total abstinence and the abolition of slavery, and, after the civil war of 1861–5, for woman suffrage. In 1868 she founded the *Revolution*, and was one of the authors of a *History of Woman Suffrage*, 1881–7. See her *Life* by Harper, 1898.

Anthony's Fire, St., *see* under SKIN.

Anthophyllite (Gk. ἄνθος, flower, φύλλον, leaf), a mineral belonging to the Amphiboles, containing silicate of magnesium and of iron. It is of a brownish-yellow colour, has a pearly lustre, and its structure is fibrous. It is a metamorphic mineral.

Anthorism, a term applied to a counter-definition, either differing from, or stronger than, the one which it follows or opposes.

Anthospermum, or amber-tree, a genus of Rubiaceæ found in Africa and Madagascar. It is allied to the coffee and cinchona.

Anthoxanthum, a genus of grasses (Gramineæ) of which the species *A. odoratum* is known to farmers as sweet vernal grass. It has pale yellowish-green flowers and only two stamens; the stems contain coumarin, which causes the fragrance of new mown hay.



ANTHOXANTHUM

a, flower head magnified

Anthozoa (Gk. ἄνθος, flower, ζῷον, animal), a class of Cœlenterata, which includes corals, madrepores, and sea-anemones. All inhabit the sea, usually in the warm climates. They are synonymous with the Actinozoa.

Anthracene ($C_{14}H_{10}$), a substance prepared from coal-tar. The coal-tar is subjected to fractional distillation: the fraction up to 170° consists of crude naphtha, from 170° to 230° carbolic oil is separated, from 230° to 270° creosote oil is separated, and above 270° the distillate is A. oil, whilst the residue in the still is pitch. The A. oil is distilled again with one-third of its weight of potash in an iron retort; the distillate, which consists of A. and phenanthrene, is treated with carbon bisulphide, which dissolves the phenanthrene, leaving A. The A. is afterwards purified by crystallisation from benzene.

A. is a crystalline solid, melting at 216·5° and boiling at 351°. It is only slightly soluble in alcohol and ether, but is easily soluble in benzene. Its commercial importance arises from the fact that it is the basis of the manuf. of the important dye-stuff *alizarin* (*q.v.*) employed in producing Turkey-red.

Anthracite, or stone coal, a particularly hard and lustrous variety of coal, slow in ignition, but giving out an intense heat with little effusion of smoke. It is used for drying hops and malt; in blast furnaces where a high temperature is required; and for steam navigation purposes. It has been suggested that A. has been produced from vegetable matter that has been more completely macerated and deprived of its putrescible constituents before submergence than that producing ordinary bituminous coal, or that the submergence took place in shallow water where the plant substance was exposed to the oxidising influence of the air, thus minimising the amount of hydrogen and carbon compounds. Most As. contain 90 per cent. of carbon, whilst bituminous and gas coals contain from 75 to 80 per cent. of carbon, the remainder being made up of hydrogen, oxygen, and nitrogen together with varying amounts of ash.

A. is found in large quantities in Pennsylvania and in S. Wales, where more than half of the supply is exported for use on steamers in all parts of the world.

Anthracosia, a fossil bivalve mollusca, probably a fresh-water mussel,

… measures of … of mammi- … gypseous and lignitic strata of Paris and Tuscany. They belong to the family Anthracotheriidæ of the order Ungulata and somewhat resembled pigs in shape. They appeared in the Eocene and Miocene periods.

Anthraquinone ($C_{14}H_8O_2$), an organic substance derived from anthracene by oxidation with nitric acid or chromic acid. It is manufactured on the large scale by oxidising 50 per cent. anthracene produced in the distillation of coal-tar with sodium bichromate and sulphuric acid. The dried filtrate is heated at 100° with concentrated sulphuric acids, by which means the impurities are converted into soluble sulphuric acids, so that the pure A. may be separated out.

A. crystallises in light yellow needles, melts at 277°, and sublimes at higher temps. in sulphur-yellow prisms. Its commercial importance lies in the fact that it is an intermediary substance by which anthracene is ultimately converted into alizarin.

Anthrax, an acute, infectious disease, common to animals and man, caused by the *Bacillus anthracis*.

The disease is widely distributed as it affects animals, but appears to be particularly associated with marshy dists. There are two forms, external … nal A. is accom- … pustules in any … body, accompanied by fever. They rapidly attain a great size, general infection takes place, causing death within a few hours. Internal A. exhibits no reliable pro- … in animals; the … sudden death … by convulsions. … place at once, ultimate recovery is possible. The only protective measure is inoculation with A. serum.

A. in man may also be external or internal. In external A. a small papule appears at the point of infection, which is usually a small wound on an exposed part. The papule increases in size, then breaks, leaving a dark blue or black scab. The area gradually extends, may be cast off if recovery occurs, but is accompanied by general disturbances comprising fever and prostration leading to ultimate collapse in unfavourable cases.

… bloody diarrhœa. Convulsions or spasms are followed by collapse. Certain cases of A. are traceable to particular occupations, such as *Wool-sorter's Disease*, occurring among operatives in factories in which imported wool or hair, mostly from Russia and S. America, is sorted; and *Rag-pickers' Disease*, occurring among the rag-sorters in paper-mills near Graz.

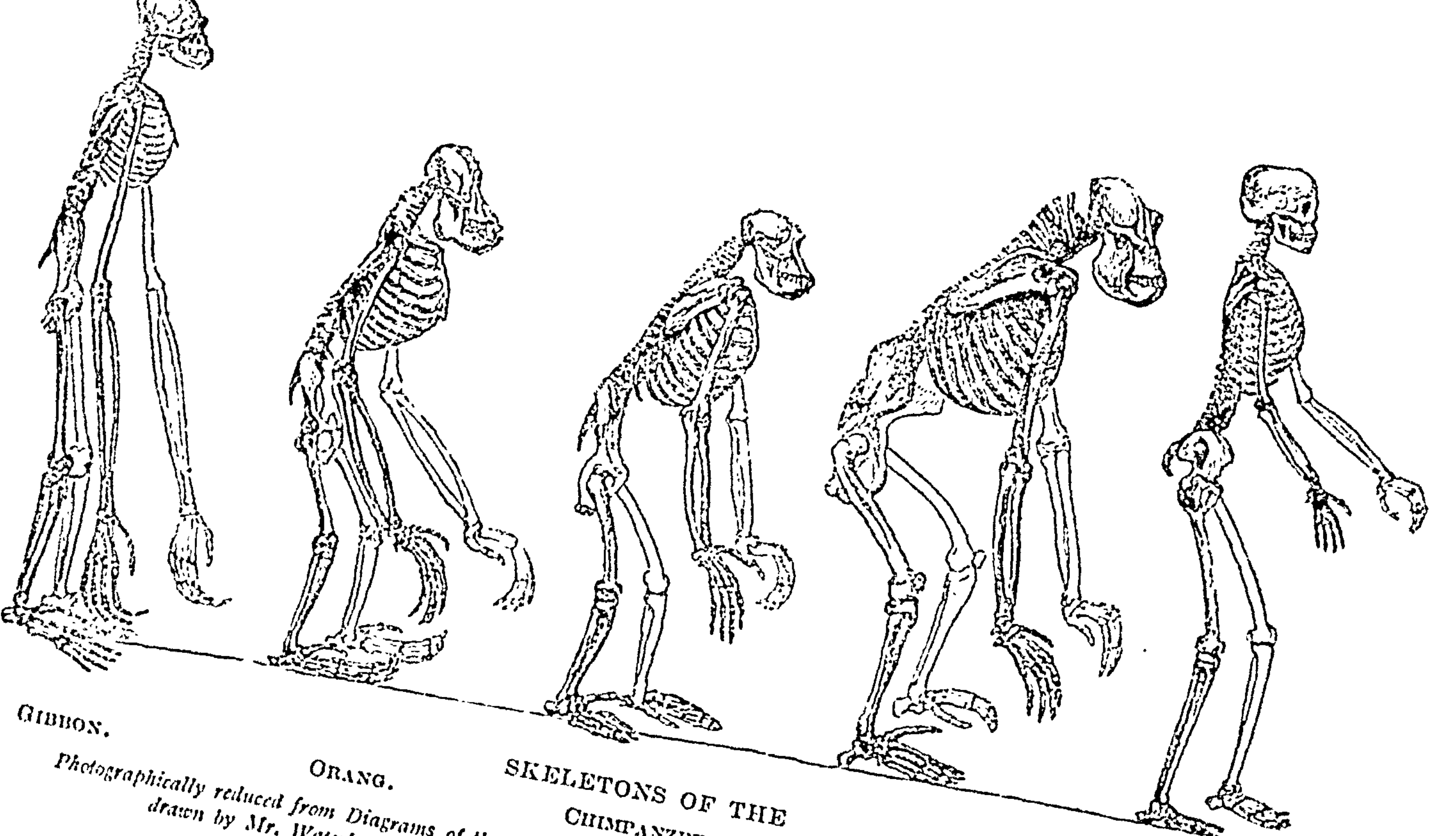
Where cases of A. have occurred in animals, the hair, hides, wool, and bodies should be burnt. Disinfection of the premises and prohibition of grazing in the infected area should be made compulsory.

Anthropoid Apes (Gk. ἄνθρωπος, man, … sometir… of the … Simiida… logical … have n… arborea… There are extinct and fossil species, but there also occur living species in the gorilla, orang-outan, chimpanzee, and gibbon, which are found in the E. Indies and W. Africa (*see* illustration on p. 359). *See* R. Hartmann's *Anthropoid Apes*, 1883; T. H. Huxley's *Man's Place in Nature*, 1863 (Everyman, No. 47).

Anthropolatry (Gk. ἄνθρωπος, man, λατρεία, worship), the payment of divine honours to a human being, a term always used in a condemnatory sense. The charge of A. was brought against the heathen by the early Christians, for, according to the pagan mythology, men had qualified themselves to receive divine honour. The sam… …lled against the … by the sect of t… …00), a heretical … to acknowledg… …ist.

Anthropology, the study of man; a subject of great complexity involving the consideration of man's place in the animal kingdom as determined by his physical, mental, and moral characteristics, his history and development, the origin and growth of language, ethics, religion, and social institutions; the div. and subdiv. into races, nations, and castes, and all the manifold activities of which man is capable. Every fact has its value in throwing some light on the place and destiny of man in the universe; in this article it is proposed merely to indicate under certain headings the scope of the various divisions of the subject.

Physical A. or *somatology* deals principally with anatomical measurements. Such measurements may have one of three ends in view: to provide material for scientific classi-



GIBBON. ORANG. CHIMPANZEE. GORILLA. MAN.

SKELETONS OF THE

Photographically reduced from Diagrams of the natural size (except that of the Gibbon, which was twice
drawn by Mr. Waterhouse Hawkins from specimens in the Museum of the

fication, to test the efficiency of the individual for military or other service, or to aid in the identification of the individual in any registered class, such as the criminal. In a mixed community it is possible to dissect out its racial elements by a comparison of stature, skull dimensions, facial angle, character of nose, colour of hair and eyes, etc., and thus provide a basis for classification. The examination of eyesight, skull capacity, lung capacity, etc., in connection with different classes and occupations comprises a method of taking stock of the population, determining whether efficiency is being maintained or not, and providing danger signals for the guidance of legislators. In registering the peculiarities of criminals for future identification, note is taken of stature and other skeletonic measurements, old scars, tattoo marks, colour of the eyes, and finger-prints.

The attention of physical anthropologists has been taken up mainly with measurements of the skull. The reason is that man's distinctive characteristics as compared with other animals have had their expression in the modification of the shape of the skull. The assumption of the erect attitude caused a change in the relationship of the head to the cervical vertebræ, and the liberation of the hand relieved the jaws from much heavy work, so that the human jaw became reduced in size. The size of the brain increased with greater brain power, so that the state of civilisation of a race can to some extent be gauged by skull measurements. Too much reliance must not be placed upon observation of the shape of the skull, for it is notorious that in any roup of civilised men all varieties of kull may be met with, but in taking general survey, what is called the ranial index varies considerably for ifferent races. The cranial index is otained by measuring the greatest eadth and greatest length and comting what percentage the former is the latter. When the index is der 75 the skull is said to be doliocephalic; between 75 and 80, saticephalic; and over 80, brachyhalic. It is noteworthy that lls of the different types are disuted generally over the world.

he very recent discovery in China hat has been named the 'Peking ' (*Sinanthropus*), a pre-Neanderskull, constitutes, according to G. Elliot Smith and other leaduthorities, the most startling in the whole history of human ntology. This skull was found he town of Chou Kou Tien, some S.W. of Peking, but the precise ter, geologically, of the location is now (1930) the objective of Roy Chapman Andrews, of t American Museum of Natural H tory, who set out on May 24, at t head of the Central Asiatic E pedition, for Mongolia to concentra on a careful search for the ancestor of the already famous 'Peking Man As a guide to our knowledge of th descent of man, this skull naturally challenges comparison with *Pithec-anthropus* (*see* PITHECANTHROPUS ERECTUS), the Javan skull, and with *Eoanthropus*, the almost equally famous Piltdown skull discovered by Mr. Dawson in Sussex. According to Professor Elliot Smith, this Chinese skull is that of an extinct genus of the human race, having affinities with *Pithecanthropus*, which latter goes back to so primitive an age that it was long disputed whether it should be classed with apes or with man; also with the Neanderthal (*q.v.*) skull, the longest known skull of an extinct type; and with the Piltdown skull. The better opinion seems, so far, to be that the discovery establishes beyond all reasonable doubt (1) that in *Pleistocene* times there were several *genera* of man all now extinct, or, in more appropriate words, which have left no descendants; (2) that these classes were all closely allied to the gorilla and that the necessary inference is that man and the great apes are not only descended from a common ancestor, but have separated comparatively recently (as time is reckoned in geological terms). These deductions are consistent with the conclusions of Darwin and Huxley as opposed to the view that human and anthropoid stocks have been separated almost from the era when the common stock of man, anthropoids, and all monkeys separated from other mammals. It is noteworthy, in this connection, that the Peking skull also confirms in a remarkable way the restoration of the Piltdown skull made by Sir Arthur Smith Woodward from the fossil fragments likewise characterised as unlike any other. One advantage to anthropologists of the Peking find is that it was found whole, and therefore required no restoration, and the expert Dr. D. Black was able to infer from what appear to be good grounds that it was the skull of a young adolescent female; the forehead is low, there is a heavy frontal crest and a strong median crest or ridge, and the under surface and the regions surrounding the ear, which are missing from the Javan skull, are far more primitive than in any other type of human skull and, in this, recall the structure of those features in the chimpanzee. Summing up

the evidence afforded by this Mongolian find, Professor Elliot Smith states that we can say that while it presents features analogous to those of *Pithecanthropus* and the Neanderthal man, it belongs to a genus which is definitely distinct from both, but approximates more nearly to its Javan contemporary than to its relatively recent successor, Neanderthal man. The brain-case is decidedly bigger than that of *Pithecanthropus*, but the features at the base of the skull (unknown, unfortunately, in the case of the Javan skull) show startlingly simian characteristics, which suggest a close affinity between the most primitive members of the human family and the anthropoid apes of Africa.

In spite of evidence of this character, the 'fundamentalists' of America and elsewhere continue to condemn the 'monkey demnification of mankind' as opposed to natural and revealed truth. Many prominent American scientists too, while not denying the received doctrine of descent, think that Darwin and Huxley were, at all events, wrong in placing the gorilla and the chimpanzee among the ancestors of man. The retort of British biologists is that this misconception of the position of Darwin is a phase through which English opinion passed before becoming reconciled to the strength of those evolutionists. Darwin's calm and close-knit reasoning and Huxley's analytical knowledge, together with the concurrence of most of the zoologists and biologists of the younger generation, have won the battle, so bitterly fought in the third quarter of the last century between naturalists and the comparative anatomists on the one hand and, on the other hand, the supporters of what was then deemed 'orthodoxy,' or what Sir Arthur Keith has called Darwinism.' The immense growth of knowledge in the last fifty years has furnished much fresh evidence in support of Darwin's theory, and Sir Arthur Keith, with other eminent scientists, are satisfied that the bases of this position can never be shaken. Modern anthropologists have sought and found evidence of the immense antiquity of man in many quarters of the world, and this evidence goes to show that human beings, who made tools and had habits not unlike those of the surviving remnants of the lower races, existed for periods variously reckoned at from 200,000 to 1,000 million years ago. Actual fossil remains seem to establish that there were several species of these primeval men, one of them probably the ancestor of modern man, the others all probably now extinct. In the matter of skull, skeleton, and brain the older forms are more bestial than the later. A simple diagrammatic tree of the human pedigree omitting the 'missing link' between a gorilla or a chimpanzee and savage or primitive man as something never propounded by Darwin himself, but familiarised by his various interpreters, must, almost of necessity, be abandoned in favour of a longer, more complex, and at the same time more plausible family tree. Whether or no anthropologists will ever be able to trace with more marked precision the course of human descent from the Gordian knot of data at present available, seems doubtful.

Prior to the discovery of the 'Peking Man,' A. Hardlicka's *The Neanderthal Phase of Man* was the most significant recent event in the sphere of physical A. Hardlicka postulates only two major glacial movements for the four Pleistocene movements commonly accepted, and thinks that Neanderthal man existed towards the end of the intervening warm era. But the better opinion inclines to the view that man's ancestry is to be found before the Neanderthal man. (*Journal of the R. Anthro. Inst.*, 57, 249; *Science*, May 20, 1927.) The great number of fossil remains found in the Old World, assigning man to an anthropoid simian ancestry, is now accepted for the most part by American anthropologists as pointing to his origin in this quarter. The only find indicating an early New World existence was the molar tooth found in Nebraska, which the scientist Osborn in 1922 supposed to be a new species, *Hesperopithecus*. But since then certain new finds have been declared by W. K. Gregory to afford conclusive evidence that Hesperopithecus was neither ape nor man, and that the Nebraska tooth belonged to an extinct peccary. This upset the best evidence for an American origin, and receives still more cogent refutation from the Chou Kou Tien discovery.

Practical or experimental psychology may be looked upon as a div. of physical A. Such observations are difficult to carry out, and usually require the co-operation of the individual experimented upon. The character of sensations, existence of colour-blindness of any kind, and rates of nervous impulse all provide data for any future system of race-culture. In addition to these spheres of inquiry may be mentioned racial and regional pathology, embryology, vital statistics, statistics of fertility and sterility. The subject of human

biology, and evolution itself, must form part of physical A. It is obvious that no mere theorising on insufficient data will do much more than … that the work … ainly confined … servations, the … and a general search for material, out of which future scientists may be able to build up a real science of A., which may have its value in directing the efforts of mankind towards a greater perfection, as far as the qualities which we know to be good are concerned.

Ethnology, or *Historical and Analytical A.*, deals with the general development of man in many directions as traced in written history and reliable deductions from written history. Important among its branches is the study of sociology, which may be said to investigate the way in which communities have developed. History gives us accounts of organised communities, but the business of sociology is rather to determine the causes which led to the survival of those organisations. Systems of govs. at various periods are analysed, showing how power is arrogated, or delegated by the consent of the governed. This leads to the discussion of the nature of what is called the 'social contract,' that vast mass of assumptions and unwritten laws which are necessary to make even a primitive society possible. It is desired to trace how these assumptions became valid, or rather how they emerged in th… gle with other … man and man. … the conceptions of duty and right seems to have progressed along the parallel lines of ethics and law, with their occasional divergence and rarer convergence under the stimulus of religious inspiration. The application of the idea of evolution is of great value in the study of sociology as of A. generally, … eve… Hu… the growth of ethical ideas. The tendency of the sociologist is often to dogmatise on the absolute value of social qualities, whereas such an inquiry as we are discussing should be, in the main, limited to determining the course and causes of man's development up to the present. Such doctrines as the modern 'eugenics,' for example, must not be looked upon as the legitimate offspring of evolutionary sociology, for it is shown that even physical qualities, and still more moral qualities, are transmitted from age to age across great distances, and are not dependent upon the efficiency of the individual. Certain special aspects of social … be studied, such … of marriage la… and restrictions … the grouping an… war, commerce, … dealing with these latter, sociology must go still deeper than history: it has to estimate the effect of war on the social relationships of the conquered as well as the conquerors, to trace perhaps where an apparently obliterated social tendency recurs in a mixed people, the result of a fusion of the victors with the defeated. It is to be observed that the anthropologist has to deal with the individual as well as the … the correcting … idy may save … to er… ch.

… f ethnolo… ae origin an… arts, as tool-making, ceramics, architecture, means of transportation, clothing, weights and measures, media of exchange; the æsthetic arts, music, drawing, painting, sculpture, decoration, games, cooking, and perfumery. Among savage races we can find the rudimentary tools and appliances which have become elaborated into the mechanisms of the civilised world. The original tool was probably a stone or cudgel which was used indifferently for digging, striking, piercing, grinding, or cutting. The way in which this primitive tool becomes differentiated is illustrated in the objects associated with the stone, bronze, and iron ages, as well as in the appliances of savage tribes of our own day. Such a development as the means of transport can be traced by survivals in the United Kingdom alone. The earliest means of transport was of course the 'human beast of burden,' carrying or dragging, after which animals were pressed into the service. The animal manifestly could draw bigger burdens than they could carry, particularly if the friction were lessened by lashing goods to poles, as the American Indians are said to have lashed their property to their wigwam poles. In Scotland, Ireland, and Wales there are still to be found carts without wheels, ranging from a single pair of poles to a vehicle with a permanent receptacle for goods. The addition of rollers to lessen friction led to the development of wheels, and carts are still found in Scotland and Ireland which are mounted on sections of the trunks of trees. The built-up wheel was a later development which led naturally to a considerable increase in size. Other branches of technology can be studied by reference not only to anct. accounts and drawings, but

also to curious survivals of our own day, due in some cases to peculiarities of circumstances, and in others to the fact that even in highly civilised countries there are some secluded spots which have escaped the struggle for survival, and which therefore preserve ideas and contrivances which have long been obsolete elsewhere. Another interesting example is provided in the games of children. The child imitates his elders in his play and constructs a make-believe world in which the processes of the work-a-day world are more or less faithfully reproduced. There, is however, this difference. In the actual world of struggling men and women the principle of utility, if not supreme, has enormous sway. Therefore the appliances and methods which have been improved upon, and which are therefore no longer efficient, are abandoned and forgotten as so much useless lumber. It is not so with the child. If the game is amusing, if it provide the necessary excitement and movement, the generations of children will preserve it until its connection with the real world has become shadowy. Eng. boys still play with bows and arrows, sword and shield, slings and catapults, although their elders have long ago abandoned them for more efficient weapons; they still have mimic combats between Fr. and Eng. with much rush and noise, although the *entente cordiale* is a long-estab. institution. Certain ball games are almost identical with games played in anct. Greece, and had their origin probably in military exercises. Amongst girls, certain of their games with their unalterable ritual are suggestive of religious and funeral exercises. Much might be done in the way of recording existing games and connecting them with their shadowy ancestry.

The study of religion is of prime importance in ethnology. It is desired to investigate the psychological origin and development of religion; personal, family, tribal, and world religions; animism, fetichism, polytheism, monotheism, and atheism; mythology and mythogeny; symbolism and religious art, sacred places and objects; rites, ceremonies, and mortuary customs; religious teachers, classes, and doctrines; theocracies; analysis of special religious; philosophy and natural history of religions.

Psychologists, particularly in Germany, have long been engaged in seeking to explain religion by the phenomena of mind, and to trace it back to its origin. Comte described the primitive religious feeling as the consciousness which man has of the life in him being shared by all external bodies. It has been suggested that the consciousness of life in man and animals as distinct from inorganic matter first gave the idea of a higher power or potency. Some, like Grant Allen, have thought that the phenomenon of death first stimulated the idea of 'something, not ourselves' which may depart without any visible sign, and that worship really started with the idea of propitiating the thing that might come back and resume its power over the body. To this fear was attributed also the origin of putting cairns or large stones over the corpse to make it secure. That the religious feeling originated at a very early stage in man's conscious life is evident from the fact that no savage tribe of to-day, no matter how low their organisation, appear to be absolutely devoid of a religious idea.

Yet another branch of ethnology is the study of linguistics. This may be divided up into the following fields for research: gesture and sign-language, spoken language, parts of speech, logic of grammar, origin, growth and classification of languages, relation to ethnography; written language, pictographic, symbolic, ideographic, and phonetic writing, evolution of alphabets, phonetic systems; forms of expression, poetic (metrical and rhythmical), dramatic and prosaic.

The importance of language in the development of the human race cannot be overestimated. It is here that evolution is most gradual, and least susceptible to acute crises amongst all the records of human progress. Changes there are in plenty, but they follow such well-recognised tendencies that language may be said to be a science with definite laws, and the evidence of language is of great value in determining past movements of masses of the human race. The origin of language undoubtedly was the desire for communication, and it is the possibility of communication in fairly definite terms which has enabled man to inherit from his predecessors their stores of knowledge and to co-operate with his contemporaries in all those forms of collective activity which are increasingly characteristic of man's development. Communication can be estab. by pictorial illustration (the origin of writing), by gestures and movements of the face, and all these have been employed and are still employed by certain sections of mankind. But the greater economy of the voice, the fact that speaking left the hands free to be engaged in other work, favoured that means of communication in preference to any other. How far imita-

tion was the directing principle in the production of the first words is difficult to estimate; probably most language originated in conventional expressions with any sort of authority, evolution deciding which should survive. In graphical illustration, imitation is less difficult and more expressive, but even here we find the need for economy gradually determining the evolution of the picture into a conventional symbol; and the restriction of the number of symbols to an alphabet is simply the result of the recognition of the possibilities of the permutations and combinations of a limited number of symbols.

Ethnology also includes the study of folk-lore, embracing traditional customs and narratives, folk-sayings, superstitious beliefs and practices. The origin of many traditional narratives may undoubtedly be found in myths explanatory of religious and natural phenomena. The philological school of folk-lorists made the mistake of associating the folk tradition with the myth when the connection had long ceased to exist. In their development through different ages and peoples folk traditions have received sundry additions and undergone many modifications, sometimes with, and sometimes without, a parabolic intention. The foundation of the Folklore Society in England in 1878 did much to stimulate the collection and comparative study of folk-lore in this and other lands.

Ethnography includes the study of people on a geographical basis, and is therefore closely allied with ethnology. It may be divided into *general ethnography*, which discusses the origin, characteristics, and sub-divisions of races and peoples, 'geographical provs.' or 'areas of characterisation,' anthropo-geography, and lines of migration and national intercourse; and *special ethnography*, which divides the races for special study, as Eurafrican or white race (N. Mediterranean and S. Mediterranean branches); the Austafrican or black ...; the Asian race (Sinitic and ...ic branches); the American race: ...ar and littoral peoples (Nigritic, ...yic, and Australic stocks).

... many ways ethnography will differ from ethnology as being a ...ne of attack, and anthropologists found that the method of selecting the area for exhaustive study has ...productive of good effects, and ...d collection of anthropological ...al, accurate in detail and free ...ash ... is rapidly ... ...ng special ... ethnography may ...ationed the necessity for ac...sation and the influence of climate on races, individuals and institutions.

The last great div. of the subject is *Archæology*, which deals generally with antiquities, especially with material remains. General archæology deals with the geology of the epoch of man, glacial phenomena, diluvial and alluvial deposits, physical geography of the quaternary, prehistoric botany and zoology; the prehistoric ages, the stone (paleolithic and neolithic), bronze and iron ages; prehistoric commerce, palethnology, and the proto-historic epoch. The chief sub-divs. of special archæology are Egyptian, Assyrian, Babylonian, Phœnician, classical, mediæval, and American archæology.

Numerous societies are now in existence for the purpose of archæological research, and although the study was originally looked upon as a mere aid to the elucidation of classical literature, and afterwards as a means of recovering objects of great artistic value, its place in the science of A. is now assured. Many stages in the development of savage races of modern times have been well illustrated by objects recovered from the stone, bronze, and iron ages, for it must not be forgotten that in the present time there are peoples who have not yet emerged from what is often looked upon as a purely prehistoric condition. *See* T. H. Huxley, *Man's Place in Nature*; A. C. Haddon, *Study of Man*; D. G. Brinton, *Races and Peoples*; A. H. Keane, *Ethnology*. For works on the 'diffusionist' theory of human culture see the books of G. Elliot Smith and W. J. Perry. For archæology *see* Boyd Dawkins, *Early Man in Britain*; W. G. Smith, *Man, the Primeval Savage*. For folklore and primitive religion *see* J. G. Frazer, *The Golden Bough*; Tylor, *Primitive Culture*. *See also* Max Müller, *Lectures on the Science of Language*.

Anthropomorphism, a modern adaptation, signifying the attribution of human physical and moral qualities generally to God or the gods. The most recent extension of the word is by psychologists to denote the principle according to which man is said to interpret all things through himself.

Anthus, name given by Bechstein to the pipit or titlark. It has a slender body, notched and fairly long beak. It resembles the *Alauda*, or lark, and is related to the wagtail. It belongs to the tribe Passeriformes of the order Neornithes.

Anti-Aircraft Defence. Guns for A.A. work fall naturally into two classes—the artillery weapon proper, and light automatic weapons or

machine guns. Almost universal practice is to have one heavy equipment of about 4-in. calibre for fixed defence, a standard equipment of about 3-in. calibre for general purposes, and one or more calibres of light automatics to deal with very low-flying aeroplanes. The characteristics of the aeroplane target are high speed and almost complete freedom of manœuvre in space. The target is small, and so direct hits with the heavier projectiles cannot be expected, and it is necessary to rely on placing a high-explosive burst near the aeroplane to achieve effect; in the case of the low-flying aeroplanes the opportunity is so fleeting that a spray effect from a machine-gun is the only possible method of engaging it. The A.A. gun must be capable of firing at all angles of elevation from 0° to 90°, and must have all-round traverse. The elevating and training gears must be such that the gun can be moved rapidly and smoothly, as firing is continuous once the target has been engaged, and the layers must keep the gun pointed in the right direction all the time; there is no deliberate laying and firing shot by shot, as in other forms of artillery. Owing to the speed of the target, saving of time is all-essential. Breech mechanisms must be automatic, and the muzzle velocity and ballistic efficiency of the projectile must be great, so as to reduce the time of flight to a minimum. The ammunition must be fitted with a very accurate time-fuse, as an error of one-tenth of a second causes an error in space of about 50 yds. Rates of fire are as high as twenty-five rounds per minute for the 3-in. gun; the target may move more than a mile between the time the gun is fired and the time the shell bursts. The modern trend is to determine where to burst the shell by means of calculating instruments known as predictors or directors. These instruments electrically transmit all necessary gunnery data to dials on the gun, and no gun-sights are used, the layers merely keeping the gun laid by following up the indications on the dials. *Anti-Aircraft Defence* by day consists of guns only, by night of sound locators, searchlights, and guns. The sound locators are trumpets based on the binaural sense and put the searchlights on to the target. The searchlights are arc lights of about 90 cm. aperture and produce a beam of light which, under average conditions, can illuminate a target up to 4000 yds. away.

Antiarin ($C_{14}H_{20}O_5 + 2H_2O$), the active principle of *Antiaris toxicaria* or *Upas antiar*, a Javanese poison tree. It is intensely poisonous and is used as an arrow-poison.

Antiaris, botanical name of a genus of trees of the order Moraceæ found in the E. Indies. The *A. toxicaria* is the upas-tree of Java, which contains a deadly poison. The is. contains volcanic valleys which emit carbonic acid gas, fatal to animals and plants.

Antibes, an anct. fortified seaport and health resort in the Fr. Riviera, 12 m. S.W. of Nice. It has some tobacco factories, and grows oranges and olives. Pop. 12,768.

Antiburghers, a name given to those members of the Secession Church of Scotland who in 1747 condemned the burgess-oath, and formed the General Associate, or Anti-burgher, Synod.

Antichlor, a name given by paper-makers and bleachers to any substance used to neutralise small quantities of free chlorine which the paper or cloth retains, after the rags have been bleached by chloride of lime. The chlorine would act injuriously on the fabric and destroy the dyes of cloth, and would bleach the inks used in printing or writing, and in time destroy the fibres of paper. Thiosulphate (less correctly known as hyposulphite) and, more rarely, sulphite of soda are the prin. As. used. The A. is added to the bulk of the paper, or rag-pulp, till no chlorine can be detected by the test of potassium iodide.

Antichrist. It follows from the duality of the universe, a duality in which every positive has its negative, that the figure of Christ should, as the shadow follows the sunlight, be accompanied by the idea of A. The use of the word shadow here is no chance metaphor, for though the word or words implying the idea of A. is common enough in the Jewish and the early Christian sacred writings, the anti-Messianic power is very shadowy and indeterminate. Part of this is doubtless due to the dual meaning attached to the Gk. preposition *Anti*, a word implying both substitution and opposition. Thus the A. may be either a false claimant to the Messiahship or an opponent of the true Messiah. Much of the importance attached to the concept of A. in the early Christian writings arose from the fact that the idea of A. was bound up with the imminent second coming of Christ, an idea which so obsessed the early Church. With the gradual decay of the belief in a speedy second advent the idea of A. also receded in importance, and to this day the Roman Catholic Church has never decided anything concerning his history or even his existence. Such a reluctance to apply the term

definitely has not characterised the Protestant reformers. With Luther they did not hesitate to apply this appellation to the pope, and such a declaration is embodied in the Schmalkald articles and later in the Westminster Confession of Faith. Such an attack brought its natural reaction, in which Luther was declared by some Catholics to be A. or the 'Man of Sin.' Mohammed, the Grand Turk, and both the Napoleonic Emperors of France have been identified with A. In the N.T. the word only occurs in the Epistles of John (1 John ii., 18 and 22; iv. 3; 2 John, verse 7), and here it has the significance of an antagonist to Christ, but in the synoptic gospels is found the older or Jewish conception of A. as a false Messiah. It is curious to reflect that while the Jews, especially in their later rabbinical books, regarded A. as one who should arise among the Gentiles and whose presence and teaching would be inimical to the faith and race of Israel, on the other hand Paul the apostle, who had to bear the brunt of Jewish opposition to the new faith, and other early eschatologists personify A. as a Jewish pretender. Thus to the devout Judaist A. was known as Armilos, or Armillus, an equivalent for Romulus, *i.e.* Rome. The early Christians, struggling for their belief against their Jewish persecutors and believing in the early return of the Founder of their faith, gave ready ear to prophecies which depicted A. as a Jew, who should rebuild the Holy City and by his signs and wonders gain the allegiance of the multitude. Enoch and Elijah should with a faithful few withstand the pretensions of this false prophet, and in the end he should be finally overthrown by the true Christ. It is against this impostor that Paul warns the Thessalonians in his second epistle to them (2 Thess. chap. ii.). The march of time brought with it [illegible] ows and [illegible], and the [illegible] by both [illegible] and the [illegible] Nero. Thus Rome was bound to [illegible] D[illegible] ly[illegible] d[illegible] came naturally to be associated with the persecutors of their faiths. The *number of the Beast* '666' (Rev. xiii. 18) was identified with Nero by the Christians. Finally, it is necessary to emphasise the fact that A. is not [illegible] Christ was of God.

Anticlimax is a rhetorical figure in which the expressions, after rising in intensity, suddenly fall to a lower level, producing a ludicrous effect. It is allied to bathos and opposed to climax.

Anticlinal (Gk. ἀντί, away, κλίνειν, to incline), a geological term which expresses that from a certain line or axis the strata dip in opposite directions.

Anti-Corn-Law League was formed in 1838-9 at Manchester. Its object was to effect the repeal of the corn laws in Britain. The cause was promoted by oratory and by a special paper called *The League*, and among its leading supporters were Cobden, Bright, and Villiers. It dissolved itself when its object was achieved in 1846-9.

Anti-corr[illegible] to prevent [illegible] exposed to [illegible] influences. As. are of two classes: protective, such as an application of hot tar or some magnetic oxide of iron; and galvanic, such as a coating of zinc or some other electropositive metal to which the corrosion is transferred.

Anticosti, an is. in the Gulf of St. Lawrence, which it divides into two channels. It is low-lying and sterile, though [illegible] trout, a[illegible] and bea[illegible] and 30 broad, and was purchased and stocked as a game preserve by M. Ménier.

Anticyclone, an atmospheric system marked by an area of high barometric pressure, caused by descending air, and surrounded by circular isobars. Th[illegible] warmed [illegible] radiation [illegible] weather is marked by clear air and frost in winter and by blue sky and heat in summer, with heavy dews. The centre of the system is calm, but winds blow out from it spirally, in the N. hemisphere in the direction of the hands of a watch, and in the opposite direction in the S. hemisphere.

Anticyra was the name of sev. tns. of anct. Greece, noted for hellebore, the anct. remedy for insanity.

Antidicomarianites (from the two Gk. words ἀντίδικος, adversary, and Μαρία, Mary) was the name given to a sect who believed that Mary, the mother of our Saviour, did not continue a virgin after his birth, as the Roman Catholic Church asserts, but bore other children to her husband Joseph.

Antidiphtheric Serum. The treatment of diphtheria by means of an anti-toxic serum was introduced in 1894, as a result of experiments in

...ed by Dr. Behring. Its use has resulted in greatly decreased mortality, and inoculation both shortens the course of the disease and prevents the harmful action usually exerted on the nervous system. The serum also has some prophylactic properties.

Antidotes, medicines that relieve or remove the symptoms caused by poison. An A. may be *chemical*, *i.e.* one that changes the nature of the poison so as to make it insoluble or harmless; *mechanical*, *i.e.* one that prevents absorption by holding the poison in mechanical suspension, or by coating the stomach; or *physiological*, i.e. one that counteracts the physiological effects of a poison. A *universal A.* is provided by mixing one part of dissolved iron sulphate with two parts of magnesia water. To mineral acid poisons, alkalis are As. The most suitable are lime, soap, chalk, potash, soda, or magnesia; they should be moderately diluted with water. Freshly precipitated oxide of iron, followed by a solution of potassium carbonate, is to some extent a chemical A. to prussic acid. Atropine is an A. to aconite, ...ellebore, veratrine, and morphine. ...eak acids such as vinegar are As. to ...kalis. Tannin or tea, charcoal, and ...orphine are As. to atropine and ...lladonna. Epsom salts and Glau...r's salt are As. to carbolic acid. ...tash and injected atropine or ...ychnine are As. to chloral. Egg ...umin and milk form an A. to cop... salts. Ammonia is antidotal to ...nalin. Zinc sulphate is an A. to ... salts. Potassium permanganate ...n A. to opium or morphine and to ...chnine if immediately adminis...d.

...tietam, a narrow but deep riv. ...ryland, U.S.A., flowing into the ...mac. A prolonged battle was ...t on its banks between the ...als and the Confederates in ...1862. The former were victori...t with the loss of 13,000 men.

...febrin, *acetanilide*, chemical ... $(C_6H_5{\cdot}NH{\cdot}COCH_3)$, a crystal...bstance obtained by acting ...ine with glacial acetic acid. ...n analgesic and anti-pyretic, ... it is undesirable to use it ...e fever is prolonged, as its ...ass off so quickly. It quickly ... the pain of migraine and ..., and is the chief or only ...nt of many advertised 'head...ders,' etc. It is liable to ...larming symptoms, such as ...spiration, cyanosis (darken...e skin through deficient ...of the blood), and collapse, ...sually pass off if hot drinks ...ants are administered.

...eral, a party in the U.S.A. which opposed the ratifying of the Constitution.

Anti-fouling Composition, a substance applied to the submerged parts of ships to prevent the adherence of seaweed, barnacles, etc. Applications are of two types—applications which poison the adherent pests, and applications which simultaneously peel with their adhesion. This latter method is only applicable to slowly-moving sailing-ships, as any such substance would be washed off by rapid motion. Copper sheathing is chiefly used for wooden vessels, but galvanic action causes difficulty in the case of iron ships, for which the most practicable application is some form of poisonous paint, usually containing mercurial cyanide or oxide.

Antigo, cap. tn. of Langlade co., Wisconsin, U.S.A., 205 m. N.W. of Milwaukee. It is a banking city, and contains locomotive-works, foundries, and factories for wooden and iron goods. Pop. 8451.

Antigone, in Gk. mythology a daughter of Œdipus and Jocasta. She accompanied her father into exile at Colonus. After her father's death she went to Thebes, where Hæmon, son of Cleon, the king, fell in love with her. Her brothers, Eteocles and Polyneices, slew each other in single combat, and Antigone, disregarding Cleon's edict, buried Polyneices. As a punishment she was shut up in an underground cave, where she afterwards hanged herself. Hæmon, her lover, in despair put an end to his life. Gk. tragic poets have used her life and character as a subject for many of their works. Sophocles immortalised her in *Antigone* and *Œdipus at Colonus*. Euripides also composed an *Antigone*. Both writers differ in their accounts of her life.

Antigonish, cap. tn. of county of same name, Nova Scotia. It is the seat of the Catholic bishop of Arichat, and contains St. Ninian's Cathedral and the large college of St. Francis Xavier. It is a banking tn., a port of entry into Nova Scotia, and a distributing centre for a large agric. dist. The harbour on St. George's Bay is navigable by small vessels. Pop. 1746.

Antigonus (382–301 B.C.), known as Cyclops (the 'one-eyed'), one of the generals of Alexander the Great. In the div. of the kingdom after Alexander's death he received Pamphylia and Lycia. He was forced to flee into Greece, and found favour with the Regent of Macedonia. On the death of Antipater the regent, he determined to win the lordship of Asia. He became lord over Asia Minor and Syria. He assumed the title of king in 306 B.C. He failed in an attempt to

invade Egypt, and fell in a decisive battle at Ipsus in his eighty-first year.

Antigonus of Carystus in Eubœa. A Gk. writer of the third century B.C., in the age of Ptolemy II. of Egypt. He spent most of his early life in travelling. He was summoned to the court of Attala I. of Pergamum. His chief works were the *Lives of Philosophers* and *Collections of Wonderful Tales*. This collection, which on the whole is of very little value, was last edited by J. Bechmann (Leipzig, 4to), with a commentary.

Antigonus, Doson King of Macedonia, was grandson of Demetrius Poliorcetes. He assumed gov. on the death of Demetrius II. in 229 B.C. and married Chryseis, the queen-mother. His reign was a critical period in the history of the interaction of the Gk. states. He co-operated with Aratus and the Achean league against Cleomenes, King of Sparta, invaded Laconia in 221 B.C., and by the victory of Sellasia made himself master of Sparta. He repelled an invasion of the Illyrians in Macedonia. He *d.* a few months later in 220 B.C. Doson (Gk. δώσων, going to give) satirically marked his readiness to promise and slowness to perform.

Antigonus Gonatas (319–239 B.C.), Macedonian king, grandson of A. Cyclops and son of Demetrius Poliorcetes. He did not obtain immediate possession of the throne, but assumed the title of king, and after waiting seven years celebrated his accession. Pyrrhus drove him from his kingdom in 273 B.C., but he recovered it in the next year and retained possession of it until his death. The latter part of his reign was peaceful. He cultivated the arts, and gathered round him many distinguished men.

Antigua, one of the W. Indian Is., is a British possession, forming with Barbuda and Redonda one of the five presidencies of the Leeward Is. It was discovered by Columbus in 1493, settled by the Eng. in 1632, made a bishopric in 1842. It is the seat of gov. of the Leeward Is. It became a crown colony in 1898. Suffered severe damage from hurricane, 1929. Chief ns., St. John, Falmouth, and Parham. ugar is cultivated, and molasses, marinds, and pineapples are exorted. Pop. with Barbuda 29,767.

Anti-incrustators, compounds emoyed to prevent the destruction of ilers by the precipitation from the ter of various chemical impurities. e nature of an A., of course, deds upon the composition of the er in use, but it is usually an line substance which acts upon bicarbonates, etc., of the water in a way as to prevent their adnce to and corrosion of the boiler plates. The most common c pounds are caustic soda and p phate of soda. Fats and oils also used.

Anti-Jacobin, or Weekly Exami[n]... an Eng. paper founded by Geo Canning and his friends to expr their opposition to the principles a policy of the French Revolutionari The chief contributors were Cannin Frere, George Ellis, and John Hoo ham, the paper being ed. by Willia Gifford, a political satirist. It lasto from Nov. 20, 1797, to July 9, 179

Antilegomena (Gk., contradicted), term applied to certain books of th N.T. whose inspiration was not a first universally acknowledged by the Church. The books were the Epistles of James, Jude, 2 Peter, 3 John, Acts of Paul, and the apocalypse. The name was given in contrast to the other books, which were called Homologoumena (agreed to).

Antilibanus, or Anti-Lebanon, a mt. range of Syria, inferior in height to Lebanon, with which it runs parallel, and from which it is separated by the valley of Cœle-Syria. Its highest peak is Mt. Hermon, which is 9050 ft. high.

Antilles, a name sometimes applied to the whole of the W. Indies, sometimes to the two large groups, the Greater A. and the Lesser A., or Caribbean Is. The Greater A. comprise the largest is., namely Cuba, Jamaica, Haiti, and Porto Rico, as well as the small is. near their coasts. The Lesser A. comprise the Windward and Leeward Is., with the Virgin Is. (Anegada). For further information of the A., discovered by Columbus, *see* under the various names above mentioned.

Antilocapra, or Prongbuck, a N. American ruminant, somewhat resembling the antelope, but differing from it in having deciduous branched horns. The genus is also characterised by the absence of lateral hoofs. The animal stands about 3 ft. high.

Antilochus, in Gk. mythology, the son of Nestor, King of Pylos, whom he accompanied to the Trojan war. He was famous for beauty, swiftness, and skill, and was the friend of Achilles, who avenged his death when he fell in saving Nestor from Memnon. He was buried, together with Achilles and Patroclus, on the headland of Sigeum.

Antilogarithm is the number corresponding to a logarithm. Thus 100 is the A. of 2, because 2 is the logarithm of 100.

Antimachus, Gk. epic poet of the latter part of fifth century B.C., *b.* at Colophon, and a friend of Plato. His works, which show great erudition but little talent, include an epic

Thebais, highly esteemed by Alexandrine critics, and an elegiac cycle *Lyde*. The *Thebais* was ed. by Kinket in *Epicouim Græcouim Fragmenta*, vol. i., 1877, and *Lyde* by Bergk in *Poetæ Lyrici Græci*, 1843.

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In medicine, potassium antimonyl tartrate, known as tartar emetic, is administered in small doses as a diaphoretic and expectorant, and in doses of from 1 to 2 grains as an emetic. A. trisulphide is given in doses from 1 to 5 grains for the same purposes. In larger doses, A. is an irritant poison, causing vomiting and purging. Chronic antimonial poisoning is characterised by nausea, progressive weakness, and may end in death by exhaustion.

Antinomianism (Gr. ἀντί, against, νομός, law), the doctrine that Christians are freed from obligation to keep the law of God. Antinomian is the term applied by theologians to those who hold that faith in Jesus Christ dispenses with, and renders unnecessary, so far as a future state is concerned, the observance of morality and the performance of good works. The dispute as to whether man is 'justified' by 'faith' or by 'works' is one of the oldest in the Christian Church, and it is evident from sev. passages in the N.T. that the apostolic church was divided on the matter, but it was not until the Reformation that the term was first used. It was applied by Luther to the followers of John Agricola, his fellow townsman, who was *b.* at Eisleben in Saxony. At Wittenberg in 1537 Agricola maintained in a disputation the Antinomian point of view, which was controverted by Luther, Melanchthon, and others. The 'Antinomian Controversy' was terminated in 1540 by a retraction by Agricola. A. found foothold in this country during the Commonwealth, but the assembly of divines in 1643 condemned sev. writings which appeared to them antinomian. Parliament in 1648 enacted that any one convicted, on the oaths of two witnesses, of maintaining that the moral law of the Ten Commandments is no rule for Christians, or that a believer need not repent or pray for pardon of sin, should publicly retract, or, on his refusal, be imprisoned till he found sureties that he would no more maintain these doctrines.

Antinori, Marchese Orazio (1811–82), It. traveller and zoologist. During 1860–1 he explored the Upper

invade Egypt, and fell in a decisive battle at Ipsus in his eighty-first year.

Antigonus of Carystus in Eubœa. A Gk. writer of the third century B.C., in the age of Ptolemy II. of Egypt. He spent most of his early life in travelling. He was summoned to the court of Attala I. of Pergamum. His chief works were the *Lives of Philosophers* and *Collections of Wonderful Tales*. This collection, which on the whole is of very little value, was last edited by J. Bechmann (Leipzig, 4to), with a commentary.

Antigonus, Doson King of Macedonia, was grandson of Demetrius Poliorcetes. He assumed gov. on the death of Demetrius II. in 229 B.C. and married Chryseis, the queen-mother. His reign was a critical period in the history of the interaction of the Gk. states. He co-operated with Aratus and the Achean league against Cleomenes, King of Sparta, invaded Laconia in 221 B.C., and by the victory of Sellasia made himself master of Sparta. He repelled an invasion of the Illyrians in Macedonia. He *d.* a few months later in 220 B.C. Doson (Gk. δώσων, going to give) satirically marked his readiness to promise and slowness to perform.

Antigonus Gonatas (319–239 B.C.), Macedonian king, grandson of A. Cyclops and son of Demetrius Poliorcetes. He did not obtain immediate possession of the throne, but assumed the title of king, and after waiting seven years celebrated his accession. Pyrrhus drove him from his kingdom in 273 B.C., but he recovered it in the next year and retained possession of it until his death. The latter part of his reign was peaceful. He cultivated the arts, and gathered round him many distinguished men.

Antigua, one of the W. Indian Is., is a British possession, forming with Barbuda and Redonda one of the five presidencies of the Leeward Is. It was discovered by Columbus in 1493, settled by the Eng. in 1632, made a bishopric in 1842. It is the seat of gov. of the Leeward Is. It became a crown colony in 1898. Suffered severe damage from hurricane, 1929. Chief tns., St. John, Falmouth, and Parham. Sugar is cultivated, and molasses, tamarinds, and pineapples are exported. Pop. with Barbuda 29,767.

Anti-incrustators, compounds employed to prevent the destruction of boilers by the precipitation from the water of various chemical impurities. The nature of an A., of course, depends upon the composition of the water in use, but it is usually an alkaline substance which acts upon the bicarbonates, etc., of the water in such a way as to prevent their adherence to and corrosion of the boiler plates. The most common compounds are caustic soda and phosphate of soda. Fats and oils are also used.

Anti-Jacobin, or Weekly Examiner, an Eng. paper founded by George Canning and his friends to express their opposition to the principles and policy of the French Revolutionaries. The chief contributors were Canning, Frere, George Ellis, and John Hookham, the paper being ed. by William Gifford, a political satirist. It lasted from Nov. 20, 1797, to July 9, 179

Antilegomena (Gk., contradicted), term applied to certain books of the N.T. whose inspiration was not at first universally acknowledged by the Church. The books were the Epistles of James, Jude, 2 Peter, 3 John, Acts of Paul, and the apocalypse. The name was given in contrast to the other books, which were called Homologoumena (agreed to).

Antilibanus, or Anti-Lebanon, a mt. range of Syria, inferior in height to Lebanon, with which it runs parallel, and from which it is separated by the valley of Cœle-Syria. Its highest peak is Mt. Hermon, which is 9050 ft. high.

Antilles, a name sometimes applied to the whole of the W. Indies, sometimes to the two large groups, the Greater A. and the Lesser A., or Caribbean Is. The Greater A. comprise the largest is., namely Cuba, Jamaica, Haiti, and Porto Rico, as well as the small is. near their coasts. The Lesser A. comprise the Windward and Leeward Is., with the Virgin Is. (Anegada). For further information of the A., discovered by Columbus, *see* under the various names above mentioned.

Antilocapra, or Prongbuck, a N. American ruminant, somewhat resembling the antelope, but differing from it in having deciduous branched horns. The genus is also characterised by the absence of lateral hoofs. The animal stands about 3 ft. high.

Antilochus, in Gk. mythology, the son of Nestor, King of Pylos, whom he accompanied to the Trojan war. He was famous for beauty, swiftness, and skill, and was the friend of Achilles, who avenged his death when he fell in saving Nestor from Memnon. He was buried, together with Achilles and Patroclus, on the headland of Sigeum.

Antilogarithm is the number corresponding to a logarithm. Thus 100 is the A. of 2, because 2 is the logarithm of 100.

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Nile with Carlo Poggia; in 1868 made a tour in Bogoland, N. Abyssinia; and in 1876 headed an expedition to Central Africa. He *d.* in Shoa.

Antinoüs, a youth of extraordinary beauty of Claudiopolis in Bithynia, favourite and companion of the Emperor Hadrian. He drowned himself in the Nile A.D. 130. Hadrian paid most extravagant respect to his memory and he built Antinoöpolis to his memory. A favourite subject in art.

Antinoüs, *see* AQUILA.

Antioch, now Antakieh in Syria. Built by Seleucus 300 B.C. after the battle of Ipsus, 301. Acquired the name of 'Queen of the East.' Here the disciples were first called Christians, A.D. 42. A. was taken by the Persians, 540, by the Saracens about 638; recovered by the Eastern emperor, 966; lost again, 1086; retaken by the Crusaders in June 1098, and made capital of a principality 1099 and held by them till June 1268, when it was captured by the Sultan of Egypt. It was taken from the Turks in the Syrian War, 1832, by Ibrahim Pasha, but restored at the peace. A. suffered much by an earthquake, and about 1600 persons were killed on April 3, 1872. Prin. cultures: tobacco, maize, cotton, and mulberry for silk production. In 1835 it had only 5000 inhab. It has a British consul. Pop. 30,000.

Antiochus Soter, or 'Preserver' (280–261 B.C.), was the son of Nicator, who after the death of Alexander raised Syria into an independent kingdom. Upon the murder of Seleucus, 280 B.C., A. succeeded to the throne, and reigned nineteen years. He prosecuted his father's claim to the kingdom of Macedonia against Antigonus Gonatas, son of Demetrius, who was his brother-in-aw, but the dispute was accommo-ated by a marriage between Antigo-us and Phila, daughter of Seleucus nd Stratonice, in consideration of hich the Macedonian prince was lowed to retain the peaceable pos-ssion of his throne. Demetrius, the n of Antigonus, also married Stra-nice, the daughter of A. A. de-ted the Gauls, who had crossed into a and settled in Galatia. He *d.* B.C. (Appian, *Syriaca*; Justin, k xxvii.; *Anc. Univ. Hist.* vol. viii.)

ntiochus Theos, or 'God' (261– B.C.), son of Antiochus Soter, ceeded his father. The Par-ns, 250 B.C., under Arsaces, ex-d the Macedonians from their try, and Arsaces became the ler of the Parthian empire. ia and other provs. E. of the followed this example; and A., hensive of the final loss of those regions, concluded a treaty of pe with Ptolemæus Philadelphus, B.C., by which he agreed to repudi his wife Laodice and marry Bereni daughter of the King of Egy These conditions were fulfilled; b on the death of Ptolemæus, two yea afterwards, A. restored Laodice to h rights, and in return was poisoned b her, 247 B.C., with the view of secu ing the succession to her eldest son Seleucus Callinicus. *See* Schlosser' *Remarks on the Reign of Antiochus II.*, *Universal historische Uebersicht*, etc.

Antiochus the Great (223–187 B.C.), was the son of Seleucus Callinicus, and succeeded his brother Seleucus Ceraunus. The young king appointed governors to preside over the sev. dists. of the Syrian empire, which, during preceding reigns, had lost much of its ter. The kingdom of Pergamus had profited by the weakness of the Seleucidan dynasty, but under the able management of Achæus, the cousin-german of A., those provs. which had been wrested from the Syrians were recovered, and Attalus or Pergamus was confined within the limits of his proper kingdom.

Achæus, who had been a faithful friend of A., finding that plots were laid against his life by those who were in the king's confidence, proclaimed himself king of those provs. in Asia Minor which he had recovered, and which had been entrusted to his charge. Ptolemæus Philopator still held Cœle-Syria and Palestine, which had been conquered by his predecessor, Euergetes. A. first took arms against Egypt, and among other places he recovered Damascus. A truce was made between Ptolemæus and A., but it expired before any agreements were made, but was resumed, 218 B.C. A. penetrated into Phœnicia, and gained possession of Galilee and the tracks E. of the Jordan. But in the following year he was totally defeated at Raphia, near Gaza, and obliged to retreat to Antioch. The Syrian king, pressed by Achæus, was compelled to sue for peace with Egypt, which he obtained on condition of resigning his claim to the contested provs. A. now turned his whole attention to the destruction of Achæus, whom he overpowered and put to death; and the provs. of Asia Minor were again annexed to the Syrian empire, 213 B.C.

Arsaces, son of Arsaces I. who estab. the Parthian empire, had overrun Media while A. was engaged in the wars against Ptolemæus and Achæus. The Syrian king invaded Parthia, and after sev. campaigns Arsaces was left in possession of Hyrcania, on condition of his assisting A. to recover the

rest of the revolted provs. After an unsuccessful attempt to recover Bactria from Euthydemus, with whom he concluded a treaty, he re-estab. the supremacy of Syria in the provs. between the Indus and Persia. He returned through Persia to Antioch, having been employed for seven years in these eastern campaigns, in which he earned the title of 'Great.' Ptolemæus Epiphanes, a child of five years old, succeeded to the throne of Egypt, 205 B.C., on the death of his father, Philopator. A. and Philip, King of Macedonia, united in a design to expel him and share the Egyptian dominions between themselves. A. regained possession of Palestine and Cœle-Syria in two campaigns; and he entered Jerusalem, 198 B.C., where he was received by the Jewish people with great joy. A. then proposed a treaty of marriage between his daughter and the young King of Egypt, by which Cœle-Syria and Palestine were to be given with the princess as a dowry. He now proceeded with a powerful fleet round Asia Minor, crossed the Hellespont, and took possession of the Thracian Chersonese, 196 B.C., which belonged to Philip, King of Macedonia; and here he came in contact, for the first time, with the power before which his own was compelled to retire. The Roms. had already reduced Macedonia to the condition of a subject kingdom, and being jealous of this interference in European affairs, they sent ambassadors to require restitution, not only of all that A. had taken from Philip, ...t of all that he had taken from ...olemæus, whose guardians, soon ...er his accession to the throne, had ...ced him under the protection of ... Roms. A. replied to these re...sitions in terms as haughty as ...se in which they were made. ...lybius, xviii. 33, ed. Bekker.) ... 195 B.C. Hannibal, driven from ...hage, came to Ephesus to seek ...protection of the King of Syria, ...is representations induced A. to ...h his strength against the power ...ome. In the winter of 192 B.C. ... the invitation of the Ætolians, ...d over into Greece with an ... posted himself in the tn. of ...rias, and was chosen by the ...ns as their commander-in-... A. captured Eubœa, but he ... push on his conquests with ... The Roman consul, Acilius ..., defeated the Syrian king at ...pylæ, and he was compelled ... to Asia, 191 B.C. The next ... Cornelius Scipio was consul, ...inted to conduct the Syrian ... his brother, the celebrated ... served under him as ... A. withdrew his forces from Europe, and the Roms. cros... the Hellespont. He now offe... terms of peace, but the Roms. ... manded more than he would c... cede, and he met the consul Scip... 190 B.C., in a pitched battle ne... Magnesia, near Sipylus, in which ... was defeated with immense slaughte... A. retired to Syria, and yielded to th... terms of the conqueror. He was t... resign the provs. W. of Mt. Taurus... to pay 18,000 Euboic talents for th... expenses of the war; to deliver up to the Roms. his elephants and ships of war; and to place in their hands Hannibal, and other foreigners who had taken refuge at his court. Hannibal, with another, preserved his safety by flight; the rest were delivered up, together with hostages for the observance of the treaty, of whom A. Epiphanes, the king's younger son, was one.

In collecting means to pay the heavy burden imposed upon him, A. plundered a wealthy temple in the prov. of Elymais. But the people of the place rose in arms and massacred him and his attendants, 187 B.C., in the thirty-seventh year of his reign and fifty-second of his age. A. did more to restore the greatness of the Syrian kingdom as under the first Seleucus than any other of his dynasty; but he was unfortunate in meeting the first shock of that power before which all the kingdoms of the known world were destined to fall. (Polybius, lib. 5, etc.; Appian, *Syriaca*; Liv., lib. 36, 37; Raleigh, *Hist. of World*: *Anc. Univ. Hist.*, vol. viii.)

Antiochus Epiphanes, or 'Illustrious' (175–164 B.C.), the second son of Antiochus the Great, succeeded his elder brother Seleucus Philopator. A. at the time of his brother's death was on his way from Rome, where he had been a hostage. Egypt now reclaimed the provinces of Palestine and Cœle-Syria, wrested from her by Antiochus the Great. In the first campaign, 171 B.C., A. routed the Egyptians between Mt. Casius and Pelusium, and fortified the frontiers of Palestine against farther aggression. In the next year he overran Egypt, except the strong city of Alexandria, and gained possession of Ptolemy Philometor, the young king. In the same year he sacked Jerusalem, and profaned and plundered the temple, as related in Maccabees (i. c. 1, and ii. c. 5); after which he appointed Philip the Phrygian governor of Judæa. The Alexandrians having raised Ptolemy Euergetes, commonly called Phyxon, the brother of Philometor, to the throne, A. again invaded Egypt, 169 B.C., and laid siege to Alexandria. Being unable to reduce that city, he left Philo-

metor as the nominal king of the country; but the two brothers agreed to hold the kingdom in *common*, and Egypt was restored for a time to tranquillity. Thereupon, A. undertook a fourth expedition into Egypt, 168 B.C., and was laying siege to Alexandria when ambassadors from Rome ordered him to leave Egypt, and he obeyed. Returning through Palestine in the same year, he ordered that great persecution of the Jews related in the second book of Maccabees. The vigorous resistance of the ... to send a force under ... ch was totally ... with passion ... Antioch from the N. provinces, which were in a state of revolt, but he was suddenly attacked by a violent disease, and died in agony. (Livy, xlii., etc.; Polybius, xxvi.-xxxi., ed. Bekker.)

Antiochus Eupator (164–162 B.C.) son of Antiochus Epiphanes, when a child nine years old succeeded to the throne, under the guardianship of Lysias. After a nominal reign of nearly two years he was dethroned, and put to death by his cousin-german, Demetrius Soter, son of Seleucus Philopator, who succeeded to the crown.

Antiochus or Dionysus Epiphanes (144–142 B.C.), son of Alexander *Balas. Tryphon supported his claims* against Demetrius Meator, but subsequently murdered him and usurped the throne.

Antiochus, surnamed Sidetes (137–128 B.C.), was a younger son of Demetrius Soter, and brother of Demetrius Nicator. After Nicator was expelled by Tryphon, Sidetes married his brother's wife, Cleopatra, laid claim to Syria, expelled Tryphon, 138 B.C., who had held it *since* the murder of A. His reign was comparatively prosperous and tranquil. He reduced Jerusalem, 134 B.C. He defeated Phraates, King of Parthia, in three battles, and recovered all which had been wrested from Syria, except the prov. *of Parthia*; but he lost his life, 129 or 128 B.C., in a sudden attack which the enemy made on his winter quarters.

Antiochus Grypus, or '*Hook-nosed*' (125–96 B.C.). After the death of A. Sidetes, Syria was distracted by civil wars. Demetrius Nicator escaped from Parthia, and resumed the crown; but he was *soon dethroned* by Alexander Zebinus. Cleopatra, the wife successively of Balas, Nicator, and Sidetes, retained *possession*, however, of a portion of Syria, and Seleucus, he ... some dists. ... by his moth ... self King o ... jealousy, and she murdered him with her own hand. She now recalled from Athens her son A. Grypus ... Philometor, and, on his ... Grypus ... t Cleopatra beca ... ; and she was ... a poisoned draught, which she had offered to her son. Grypus reigned in peace for eight years; at the end of which a fresh competitor for the throne started up in the person of his *half-brother*.

Antiochus, surnamed Cyzicenus (112–96 B.C.), from being educated at Cyzicus, the son of Cleopatra by Antiochus Sidetes. After a sharp contest he and his brother agreed to divide the empire in 113 or 112 B.C. ... occupied Cœle-Syria, and ... f the ... d, 96 ... slain ... sor of ... ter a reign of seven months.

Antiochus Eusebes, 'the Pious' (95–83 B.C.), son of Antiochus Cyzicenus, proclaimed himself King of Syria upon his father's death. For a time he disputed the throne with his cousins, Philip and Demetrius Eukæros, sons of Grypus; and in 88 B.C. he was compelled to fly into Parthia. He returned, *86* B.C., Eukæros being dead or banished. While he was engaged in war with Philip, another A., surnamed Dionysius, full brother to Philip, seized upon Cœle-Syria. The latter was soon slain in a war against the Arabians. After a brief period, the Syrians, ... by the desolating feuds of ... nces, invited ... nenia, to take ... try. Eusebes ... 83 B.C., and ... of his life in

... Asiaticus (69– ... Antiochus ... obliged to ... a Syria to make head against the Roms., Asiaticus gained possession of part of the kingdom, 69 B.C. He retained it for *four years*, at the end of which Syria was reduced by Cn. Pompeius to a Rom. province, 65 B.C. In Antiochus Asiaticus ended the Seleucidan dynasty, which ruled Syria for 247 years, from the time when Seleucus Nicator began his reign in 312 B.C. For the chronology of the Syrian kings the reader should consult Clinton's *Fasti Hellenici*.

Antiochus of Commagene, *see* COMMAGENE.

Antipædobaptists, name given to those who deny the validity of infant

Antipope is the name given to a pope who is not recognised by the Church, but who usurps the papal power, being chosen by some religious or political party. Authorities differ as to the number of As. Some say there have been twenty-eight, others thirty-two, while some say thirty-five or thirty-six. The first A. was Novatien, chosen in 251; and then followed Felix, chosen by Constantius in 355, during the pontificate of Liberius; Ursicinus in 366, while Damasus was pope; Eulalius 418, against Boniface I.; Laurentius, 498, against Symmachus; Pascal and Theodore, 687, against Sergius I.; Theophylactus, 757, against Paul I.; Constantine, 767, and Philippe, 768, against Stephen IV.; Zizimus, 824, against Eugenius II.; ... Benedict II ... Formosus; ... Leo V.; Fra ... Boniface VII., 974, against Benedict VII.; Philagathus called John XVI., 997, against Gregory V.; Gregory, 1012, against ... VIII.; John, ... 1044, against ... alled Benedict ... los, called ... Alexander ... called Clement III., 1080, against Gregory VII.; Albert, Theodoric, and Maginulf, 1101, against Paschal II.; Maurice Bourdin, called Gregory VIII., 1118, against Gelasius II.; Anacletus, 1130, and Gregory Conti, called Victor IV., 1138, against Innocent II.; Octavian, called Victor V., 1159; Guido, called Paschal III., 1164; Calixtus, 1168, and Lando Sittino, called ... III., 1178, a... Nicolas V., 13... Robert, called ... non, against Urban VI.; Pedro de Luna, a Spaniard, against Boniface IX.; Muñoz, called Clement VIII., 1424, against Martin V.; and Felix V., 1439, against Eugenius IV.

Antipyretics, ... to reduce the ... may act (1) by ... as in the use o... and by administering copious doses of diaphoretics and sudorifics; or (2) by lessening heat production by their action on the nervous system, as in the use of antipyrine, antifebrin, and quinine; or (3) by destroying the poison which causes fever; or (4) by increasing the dissipation of heat through their action on the skin or circulation, as alcohol, aconite, antimony, etc.

Antipyrine ($C_{11}H_{12}ON_2$), or *dimethylphenylpyrazolone*, an organic substance used in medicine as a febrifuge. It crystallises in white leaflets which melt at 113°, and is soluble in water and alcohol. The aqueous solution gives a red colour with ferric chloride and bluish-green with nitrous acid.

A. has a slight effect on the temperature in health, but a marked one in fever. It has been used in almost every feverish condition, but its routine use is not now recommended. It speedily gives relief in *migraine*, headache, and neuralgia, and predisposes to sleep after the pain has disappeared.

Antiquaries, Society of, formed in the eighteenth century to promote the study of antiquities. Earlier societies had been founded in the sixteenth and seventeenth centuries, but it was not until 1717 that the society was formally reconstituted. In 1780 George III. granted the society apartments in Somerset House. It is governed by a council of twenty, and a president who is also an *ex officio* trustee of the British Museum. The present headquarters of the society are at Burlington House.

Antique Crown, *see* HERALDRY; also a special name of an American type called Egyptian by English printers.

Antiquities, *see* ARCHÆOLOGY.

Antirentism, a term applied to the action of a political party in New York state in connection with non-payment of rent. The Dutch W. India Company had granted tracts of land to its members in New York, who held the title of protector, and the colony was governed by feudal tenures. The latter were abolished by laws in 1779 and 1785, but the proprietors made an arrangement by which rents and dues should be paid as formerly. Attempts were made to resist this, and finally feudal tenures were abolished and agric. land was forbidden to be leased for more than twelve years.

Antirrhinum, a genus of plants belonging to the Scrophulariaceæ found in temperate climates. *A. majus* is the snapdragon, which is common in Great Britain; *A. orontium*, the Orontium snapdragon, or calves' snout, is a native ...

Anti-Saloo... ope, founded in 1... was ... suppression of the liquor traffic. By means of agitations, legislative measures, educational and publicity movements, it has been the most important factor in the Prohibition movement in U.S.A. With ...

... in the U.S., together

food materials preserved in such a manner should be kept in a perfectly dry place, as they are liable to absorb moisture from the air, when putrefaction becomes possible.

Besides these methods of preventing infection, there are certain chemical substances which have the power of destroying the germs of putrefaction. Their uses include the preservation of food and the prevention of septic poisoning in wounds. It is necessary, of course, that an A. employed for preserving food should not be injurious or unpalatable to man, and that As. used for dressing wounds should not have
effect upon the t
is used for the
but the use of boracic acid for this purpose is now illegal. It was, until recent years, much used to preserve milk, butter, meat, and fish. Salicylic acid is used to preserve beer, butter, fruit, and meat, but its em-

chief A. used in surgery, but its place has to a great extent been taken by mercuric chloride (corrosive sublimate). Thymol, salicylic acid, phenyl salicylate, and boracic acid are also used as As. For the dressing of wounds not made by the surgeon iodoform is often employed. It does not kill the bacteria directly, the action on the micro-organisms being subsequent to a decomposition resulting, under the influence of the heat of the body, from fermentation induced by matter exuded from the wound.

The influence of As. on the results of surgical practice has been enormous. Pyæmia, septicæmia, and gangrene are now much more uncommon than formerly, and it has been found possible to treat wounds without resorting to amputations where that course would be impossible without As. Compound fractures and extensive wounds of the limbs do not, therefore, commonly mean the loss of the limb affected. Operations, too, are performed which were formerly considered too dangerous, particularly in connection with abscesses and diseases of bones and joints.

Anti-slavery, a movement for the abolition of the slave trade was started in England by Thomas Clarkson about 1782, subsequent to Lord Mansfield's decision in the Somerset case that slaves could not exist in England. He was assisted by William Wilberforce, and in 1792 a motion in favour of gradual abolition passed the Commons. In 1805 the trade was forbidden with new colonies, and in 1807 the General Abolition Bill extended the prohibition to all British possessions. The Emancipation Act of 1833 provided for the gradual abolition of slavery in the colonies.

In the United
was practically
N. States by 17.
gradual growth everywhere of public feeling in favour of total abolition. A.-S. Societies were founded in 1832 and 1833, and most American writers, including Emerson, Bryant, Whittier, Lowell, Longfellow, and Mrs. Stowe, lent their influence in the

plied to (1) drugs which paralyse the motor centres or nerves, as anæsthetics, or which depress them, as bromides of potassium and ammonium; (2) drugs which produce a general depression of the vital functions, as tobacco, aconite, and sedatives generally; (3) drugs which relieve colic by stimulating the bowels, as asafœtida and castor; and (4) drugs which *relieve* spasm of the bronchial tubes, as stramonium and belladonna.

Antispast, a tetrasyllabic metrical foot, composed of an iambus and a trochee; the first and last syllables being short and the middle ones long, as in 'Clÿtĕmnēstră.'

Antisthenes (444–365 B.C.), founder of the Cynic school of Philosophy, *b.* at Athens. Studied rhetoric under Georgias. Became a devoted pupil of Socrates, and walked daily from Peireaus to Athens to hear him discourse. Founded a school of his own, where he attracted the poorer classes by the simplicity of his life and teaching.

Antistrophe (Gk. ἀντί, against, στροφή, a turning), part of an ode sung by the chorus on returning from left to right, having previously sung the strophe when moving from right to left. It is of Gk. origin.

Anti-Taurus, *see* TAURUS.

Antithesis (Gk. ἀντί, against, θέσις, placing), an opposition or contrast of *ideas* expressed by using words that are naturally opposed to one another.

Antitoxin, a term applied to substances elaborated by the body to counteract the toxins of bacteria. Their chemical composition is a matter of doubt, and they are probably bacterial products. It is found that when the body is inoculated with small quantities of a toxin, increasing quantities of A. are generated to

year by year. They occur, in various forms, in practically all kinds of deer, and are used for offensive purposes. The female reindeer is antlered as well as the male. Antlers with more than twelve points are seldom found in Great Britain, but heads of sixty points are in existence on the continent. Shed antlers are used commercially for handles of knives, umbrellas, etc.

Antlia Pneumatica, the 'Air-Pump,' a constellation in the S. hemisphere, named by Cacaille in 1752. It is bounded by Centaurus, Crater, Hydra, Pixis Nautica, and Argo. S. Antliae is a variable star with a period of 7 hrs. 47 mins.

Ant-lion, the larva of the family Myrmeleonidæ, of the order Neuroptera. The eggs are laid in loose sand, and when the larva has appeared it forms a conical pit, at the bottom of which it hides, and seizes upon any small insect, such as an ant, which may fall into it. By means of its legs it throws sand on its victim to hasten its fall, and by means of its mandibles, which communicate with the alimentary canal, it holds it firmly and absorbs its juices, then throws away the body. The mature insect has four wings. It is unknown in England, but s found in various parts of Europe nd America.

Antoeci, from the Gk., signifies those who live over against each her,' and is the name given to the hab. of two places which have the me lat. and long., except that one ce is N. of the equator and the er S. Those who live N. of the ator are 'A.' to those who live and *vice versâ*. Two antoecial ces have the same hour of day or t, but opposite seasons of the r.

ntofagasta, (1) a tn. and port of Chile, capital of Chilean prov. he same name. Founded in as a shipping port for the silver s in that dist. Belonged to ia until 1879. Then occupied by n military forces. The smelting for silver mines are located here. 51,498. (2) A prov. between aca and Abacama. Rich in The important silver mines of les are about 90 m. N.E. of t of A. It produces for export copper, lead, and salt. Chief Taltal, Cobija (the old capital), copilla. The prov. belonged via until 1879, and fell into possession in the war of 1879– was ceded definitely to that in 1885. Area 46,621 sq. m. 330.

e, André-Léonard (*b.* 1857), -manager, who, in 1887, he 'Théâtre Libre' at Paris for the production of unconventional plays of literary value. He directed this theatre till 1894, when he became connected with the 'Gymnase,' and later, in 1896, with the 'Odéon.' In 1897 he founded the 'Théâtre Antoine.'

Antoine de Bourbon, Duke of Vendôme, married, in 1548, Jeanne d'Albret, only child of Henry II., King of Navarre. Henry, Prince of Bearn, afterwards Henry IV. of France, was the offspring of this marriage. A. assumed the title of King of Navarre in the right of his wife. A. de B. aspired to be at the head of the administration of France after the accession of the youthful King Francis II., but failed. When the civil and religious war broke out in 1562, the King of Navarre commanded the king's troops and received a wound at the siege of Rouen, of which he *d.* in November of the same year. *See* BOURBON, HENRI IV.

Antokolsky, Marc (1842–1902), Russian sculptor, *b.* at Vilna. In 1864 he was admitted as a special student to the Academy of Fine Arts, St. Petersburg, where he gained numerous medals. In 1871 the Emperor Alexander II. bought his statue of 'Ivan the Terrible.' A. finally settled in Paris. Among his best works are 'Peter the Great' (1872); 'Christ Bound before the People', (1874); 'The Death of Socrates', (1876); 'The Last Sigh' (1878); 'Mephistopheles', (1881); 'Spinoza' (1882); 'Yermak' (1900); 'The Sleeping Beauty' (1900).

Antomarchi, Francesco (*c.* 1780–1838), Napoleon's physician at St. Helena, was a native of Corsica, and a surgeon and anatomist of considerable repute. He enjoyed the full confidence of the ex-emperor, who left him a considerable sum of money. After serving as director of hospitals in the Polish revolution, he proceeded to the W. Indies, and *d.* in Cuba. He wrote *Les Derniers Moments de Napoléon* (1823).

Anton, Robert (*fl.* 1616), poetical writer. Author of a volume of satires, *Philosophers' Satyrs*, the second ed. of which was named *Vices Anatomie Scourged and Corrected in New Satires*. Its chief interest lies in numerous references to Beaumont, Spenser, Jonson, Chapman, and Daniel.

Antonelli, Giacomo (1806–76), was the son of a wood-cutter of the It. vil. of Sonnino. After a brilliant career in the Grand Seminary at Rome, Pope Gregory XVI. preferred him to various ecclesiastical appointments. Pope Pius IX. made him a cardinal in 1847, and in 1848 president of the Liberal cabinet which

drew up the *Statuto* or Constitution. On the fall of the ministry he fled with the pope to Gaeta, but on their return (1850) again became the pope's chief minister. He amassed a large fortune.

Antonello da Messina (*c.* 1414– *c.* 1493), It. painter, a native of Sicily, was a close follower of Flemish methods of painting, which he learnt from the Van Eycks and introduced into Italy. He acquired great renown in Venice as a portrait-painter. His chief extant works are 'Salvator Mundi' and 'The Crucifixion,' both in the National Gallery, London, the portrait of an unknown man (Berlin Museum), and portraits at Dresden, Rome, Venice, and in the Louvre.

Antonia Major was the elder daughter of M. Antonius and Octavia, according to Suetonius and Plutarch, but Tacitus, (*Ann.* iv. 44; xii. 64) speaks of her as the younger daughter. She married L. Domitius Ahenobarbus. Her son, Cn. Domitius married Agrippina, and was the father of the Emperor Nero; and her daughter, Domitia Lepida, was the mother of Messalina, afterwards married to the Emperor Claudius.

Antonia Minor (38 or 37 B.C.–A.D. 38) was the sister of A. Major, and the wife of Drusus Nero, the brother of the Emperor Tiberius. She had three children, Germanicus, Livia, and the Emperor Claudius; Germanicus had a son, Caligula, who reigned. She was noted for her beauty and her chastity.

Antonienhütte, mining tn. of Silesia, Prussia, 31 m. N.E. of Ratibor. Pop. 7000.

Antonina, seaport of São Paulo, Brazil, on Bay of Paranagua, 18 m. N.W. of Paranagua. Pop. 10,000.

Antonine Column, a lofty pillar which stands in the piazza Colonna at Rome. It was raised by the senate in commemoration of the victories of Marcus Aurelius Antoninus over the Marcomanni and other Ger. tribes. The total height is 163½ ft., but the pedestal is disproportionate to the shaft. The capital is Doric, and the shaft is made of twenty-eight blocks of white marble. A spiral staircase of 190 steps is cut through the interior of the marble, and leads to the gallery on the top, which is surrounded by a balustrade. The exterior of the shaft is covered with bassi-rilievi, representing the victories of Marcus Aurelius.

Antonini Itinerarium, a register of the principal roads and routes of the Rom. empire, probably the records of the survey of Julius Cæsar. The book is divided into two parts, one of which deals with the road routes of Europe, Asia, and Africa, the other with the principal sea routes. The distances are all given from Rome. The author is not known definitely, but if it was a Rom. emperor it was probably Antoninus Caracalla.

Antoninus Liberalis, probably lived under the Antonines. He is the author of a work in Gk., entitled a *Collection of Metamorphoses*. This collection is borrowed from a variety of authors, and is valuable as containing many passages of poets who are now lost. The best ed. is that of H. Verheyk, Leyden, 1774, 8vo. (Bast, *Epistola Critica*.)

Antoninus Pius (A.D. 86–161), son of a Rom. of consular rank. Adopted by the Emperor Hadrian in 138, he succeeded him in the same year. His elevation to the imperial purple was very popular, and he almost immediately adopted a policy of reform and retrenchment. He was a patron of science, a protector of the Christians, and a sincere worker for the good of his people. He was responsible for the building of the wall of Antoninus from the Clyde to the Forth.

Antoninus, The Wall of. This was an earthern rampart and ditch, built to strengthen the line of fortifications already laid down by Agricola. The mound (*vallum*) ran from Bridgness on the Forth to West Kilpatrick on the Clyde, a distance of about 37 Eng. m. The width of the mound and ditch seems to have been about 25 yds.; its depth from the top of the mound to the bottom of the ditch has been variously estimated at between 40 ft. and 20 ft. It had in it at least nineteen well-appointed stations, with small watch-towers in between. A military road ran at the back of the 'vallum.' The object of the wall was to keep back the inroads of the barbarians, but the Rom. power was not as strong between the S. and N. walls as it was in the territory to the S. The great disadvantage of such a wall seems to have been that it required almost one-fifth of the whole of the garrison of Rom. Britain to guard it.

Antonio, Nicolas or Nicolao (1617–84), a Sp. writer, *b.* at Seville. His most important work is *Bibliotheca Hispana*, an account of Sp. writers from 1500 to 1664; Rome, 1672, 2 vols. folio, and Madrid, 1783, 2 vols. folio. For Sp. literature there is certainly neither a better nor a safer guide.

Antonio of Padua (1195–1231), a devoted follower of St. Francis of Assisi, was *b.* at Lisbon. In 1220 he entered the order of the Franciscans. He desired to devote himself to missionary labours, but being wrecked on the coast of Sicily, he wandered through Italy, gaining a great reputation as a preacher. To him are attributed many miracles and works of

wonder. He *d.* in 1231, and in the following year was canonised by Gregory IX.

Antonio, Prior of Crato (1531–95), was the natural son of Louis, younger son of Emmanuel, King of Portugal. On his return from captivity in Morocco he claimed the throne of Portugal on the death of Cardinal Henry. He was opposed by Philip II. of Spain, who had a much better claim, as had also the Duchess of Braganza. Being supported only by the peasantry, he was easily defeated, and fled to France and later to England, by both of which countries he was supported out of hostility to Spain. Expeditions fitted out by Fr. and Eng. alike failed, and he died, a disappointed claimant.

Antonius, Caius (*d.* 44 B.C.), surnamed Hybrida, son of the Orator, was the colleague of Cicero in his consulship (63 B.C.). Under the orders of the senate he had to conduct the war against Catiline, but on the day of the battle he was prevented by illness from appearing on the field, and the command devolved upon his lieutenant, Petreius. In 61 B.C. he had, as proconsul, the prov. of Macedonia. A. gave out that Cicero had stipulated for the payment of a large sum of money, in return for Cicero's aid in getting him the prov., a charge which Cicero's ambiguous language and conduct seem not to discountenance. A. was guilty of great extortion, and at the end of the first year Pompeius threatened a motion in the senate for his recall. Cicero, who avows in his private letters that he could not defend A. without injury to his own character, nevertheless exerted his eloquence most powerfully and successfully in his defence. Accordingly A. held the prov. for a second year; but on his return (59 B.C.) he was brought to trial on a charge of extortion, and of carrying on war out of his prov. without the authority of the state. Though again defended by Cicero, he was found guilty, and condemned to perpetual exile. He returned to Rome 47 B.C., and probably ...ed 44 B.C.

Antonius, Marcus, the Orator (...42–87 B.C.), the son of C. A. In ... B.C. he was the colleague of A. ...stumius Albinus in the consulship; ...l in the following year he defended ... Aquilius on a charge of extortion ...ing the Servile War in Sicily. In ...e was censor. He fell a victim to ... fury of Marius and Cinna, when ... took forcible possession of Rome ...tarch, *Marius*, c. 44). His elo...ce is celebrated by Cicero in his ...*us*, c. 37, 38.

...tonius, Marcus (*d.* 69 B.C.), ... son of the Orator, and father ...e triumvir. He was entrusted with the duty of protecting all coasts of the Mediterranean aga... the pirates. Crete was the chief sc... of his operations, and though ... partial successes gained him ... honorary title of Creticus, the outrag... and extortion of which he was guil... led at last to an insurrection in whic... he lost his life.

Antonius, Marcus (83–30 B.C.), grandson of A. the Orator, an... son of A. Creticus, was *b.* of ... patrician family, and was relate... to Julius Cæsar on his mother's side. His youth was spent in profligacy. In 58 B.C. he fled to Greece in order to escape his creditors, and in Athens he spent some time in listening to the teachings of the Gk. philosophers. Summoned to the campaign against Aristobulus in Palestine, and taking part later in a campaign in Egypt, he distinguished himself by his bravery and activity. In 54 he was with Cæsar in Gaul, and through his influence he became quæstor, augur, and tribune of the plebs. When the Civil War broke out he was one of the warmest supporters of Cæsar, and was expelled the senate house. He was deputy governor of Italy during Cæsar's absence in Spain, and later also during his absence in Africa, whilst he was second in command at the famous Battle of Pharsalia. During his period of office A. seems to have conducted himself with little tact or morality. He divorced his wife, being enamoured of the actress Cytheris, and drank to excess. He quarrelled with Cæsar when he returned, but a speedy reconciliation followed. In 44 B.C. he was consul with Cæsar and supported the offer of the crown to Cæsar. After the assassination of Cæsar he so played on the passions of the Rom. mob by publishing Cæsar's will and by his eloquent oration, that the conspirators were forced to flee from Rome, and A. was left to attempt to carry out his ambition of becoming dictator himself. In Oct. 44 he set out to attack D. Junius Brutus, who had refused to surrender the prov. of Cisalpine Gaul, which he had received from the senate, to him.

By this time, however, Octavian, Cæsar's heir, had returned, and to him flocked the soldiers of the dead Cæsar. A. was declared a public enemy and Octavian commanded the operations against him. He was defeated at Mutina. Octavian now forced the senate to give him the consulship, but meanwhile A. had escaped and had joined Lepidus. He marched towards Rome with large forces, but terms were arranged between himself, Octavian, and Lepidus where it was agreed that they should

declare themselves triumvirs and share the whole Rom. world. Gaul was to go to Antony, Spain to Lepidus, and Africa, Sardinia, and Sicily to Octavian. A huge proscription followed, in which Cicero perished a victim of the revenge of A. In 42, by the two battles of Philippi, the republican parties were annihilated. In the following year he was captivated by the charms of Cleopatra and remained in her company during the winter at Alexandria. A short outbreak of war between his wife Fulvia and Octavian recalled him, but on the death of Fulvia a reconciliation of the triumvirs took place, and he married his colleague's sister, Octavia. A fresh div. of the empire was made, Lepidus getting Africa, Octavian the W., and A. the E. In 39 he visited Athens; in 37 he renewed the agreement with Octavian, and then returned to Syria, where he was still under the spell of Cleopatra. In 32 he was deprived of his power, and war was declared against Cleopatra. In 31 he suffered defeat at Actium and fled to Egypt, where, deserted by his troops, and pursued by the enemy, he committed suicide.

Antonius, Musa, *see* MUSA.

Antonomasia, in rhetoric, the substitute of a descriptive epithet for a proper name, or *vice versâ*, as when Shakespeare is called 'the swan of Avon,' or an orator 'a Cicero.'

Antony, Saint (A.D. 251–356), called the Great, was *b.* at Koma in Upper Egypt, and was the first institutor of monastic life. He distributed his property amongst his neighbours and the poor, and retired to a wilderness near his native vil. He afterwards went further into the desert, where he lived in solitude until 305, when he founded his first monastery at Phaium, near Aphroditopolis. Seven of his letters, written originally in Coptic, but trans. into Lat., are extant in the *Bibliotheca Patrum*. The cure of the distemper, called the 'sacred fire,' was believed to have been wrought by his intercession. Since that time it was called St. Antony's fire, and in modern days erysipelas.

Antony of Padua, *see* ANTONIO OF PADUA.

Antraigues, Emanuel Louis Henri de Launay, Comte d' (1755–1812), after helping to bring about the Fr. Revolution by his democratic *Mémoires sur les Etats-Généraux*, 1788, joined the Royalists on becoming deputy in 1789. After representing the Bourbon interest at St. Petersburg and Vienna, he settled near London, where he and his wife were murdered by their servant.

Antrim, maritime co., prov. of Northern Ireland. The formation in the N. and E. is hilly, the interior sloping in the direction of Lough Neagh. The prin. elevations are Trostan, 1810 ft., and Slemish, 1782 ft. The prin. streams are the Bann, the Main, and the Bush. The coastline is distinguished by its basaltic rock formation, the Giant's Causeway being one of the finest specimens of columnar basaltic rock. Peat bogs are frequent in the interior. Salt, iron, and limestone are extensively worked, and there are coal-fields near Ballycastle. A. is the centre of the Irish linen manuf. The other staple industries are agriculture (flax, oats, and cereals), and the manuf. of cotton and wool. It has important coast fisheries. The co. returns seven members to the parliament of N. Ireland and two to that of Great Britain and Ireland. The predominant form of religion is Presbyterianism, an effect of the Scottish colonisation. Catholics are also numerous. Pop. (1926) exclusive of county borough of Belfast, 191,500. Pop. of tn. 4176. Area 1090 sq. m., of which about one-third is under cultivation. The co. tn. of A., 14 m. N.W. of Belfast, has linen and paper industries.

Antrim, Randal Macdonnell, first Marquis of, and Earl of Dunluce (1609–83), Catholic nobleman. Introduced to court, 1634; created a marquis, 1643, on account of his promise to raise an army of 10,000 in Ireland for the service of Charles I. In this he was unsuccessful, but in 1644 sent 1600 men to the aid of Montrose in Scotland.

Antrum of Highmore, in anatomy, a term applied to the maxillary sinuses, a cavity in the body of the upper jaw-bone, forming an accessory air cavity to the cavities of the nose (*q.v.*). The roof forms the floor of the orbital cavity.

Antseranana, or Antsirano, seaport on N. coast of Madagascar, on Diego-Suarez Bay. Founded in 1855. The chief Fr. naval centre in the Indian Ocean and of great military importance. Pop. 6000.

Antwerp, cap. of the prov. of A., 50 m. from the sea and 27 m. N. of Brussels, the chief seaport and commercial centre of Belgium, has been aptly named the 'Liverpool of the Continent.' The completion of the new docks and quays has brought up the total quayage length to more than 150,000 ft., making A. one of the largest ports in the world. In 1927, about 11,500 vessels of a combined tonnage of 23½ millions, entered the port, and an equal number cleared. This is over and above the 5,000,000 tons which came by canal and riv. from the interior. The chief of its

numerous manufs. are sugar, silk, cotton goods, lace, white-lead, candles, sewing-silk, and linen-thread. It is also extensively engaged in the industries of shipbuilding, diamond cutting, sulphur-refining, petroleum-refining, wool-washing, etc. Amongst its public institutions are the Academy of Painting and Sculpture, the Naval Arsenal, the Zoological Gardens, and the Academy of Sciences. Its fortifications are immensely strong, and it is considered to be one of the most strongly-fortified places in Europe. The city is exceptionally rich in treasures of architecture and painting. Amongst the most notable of these are the superb Gothic cathedral (1352–1518), with its six aisles, its famous chimes, and Rubens' masterpieces, 'The Descent from the Cross' and 'The Elevation of the Cross'; the church of St. James (fifteenth century), containing the tomb of Rubens and a beautiful altar-piece by the master; the Exchange, built in 1531, destroyed by fire in 1858, re-built according to the old design and re-opened in 1872; the Hôtel de Ville (1565); Rubens' house; and the Museum, with its unrivalled collection of Rubens' pictures and works by Steen, Rembrandt, Hals, Van Eyck, and other masters of the Flemish school. A. has had a varied and eventful history. It appears to have been founded by the Saxon tribe some time before the eighth century. In 837 it was captured by the Northmen, who retained possession for over half a century. In 1008 Henry II. made it a marquisate of the Holy Roman Empire. From the eleventh entury onwards its commerce rose o considerable importance, until, in he sixteenth century, it was the most rosperous city of N. Europe. From is proud position it was hurled by e Sp. invasion of 1576, when 8000 its inhab. are said to have been tchered, and its capture by the uke of Parma in 1585. In 1648 e Scheldt was closed by the treaty Westphalia. The city fell into hands of the Fr. in 1794. Napon visited it in 1803, and took a at interest in its possibilities. He hed to make it a great commercial military centre, with special rence to its possible use against land, and spent £2,000,000 on the truction of new docks. In 1824 as surrendered by the Fr., in rdance with the Treaty of Paris, from 1825 to 1830 it helped to , with the rest of Belgium and nd, the kingdom of the Nether. During the Belgian revolution s stoutly defended by the Dutch al, Chassé, but surrendered to . in 1832, and was finally handed over to the Belgians, whose possession was confirmed by the treaty of 1839. Since that time it has steadily advanced in prosperity to its present flourishing condition. Amongst its distinguished sons have been Rubens, Vandyck, the two Teniers, Jordaens, the dramatist Ogier, and Henri Conscience, the novelist. Estimated pop. 1,121,577 (1926). (*See* Robinson's *Antwerp*, 1904; Gens' *Histoire de la Ville d'Anvers*.)

Siege of Antwerp (1914). The Siege and defence of A. in the Great War covered the period Oct. 4–6, 1914. There is some controversy over the soundness of the Allied operations prior to the siege and also as to the precise intentions of the Ger. General Staff during the three weeks preceding the actual siege. It seems to have been the view of Lord French (then General Sir John French) that the strategy directed from Whitehall showed so little appreciation of the true position that if the Ger. Command had but taken a bolder course the town would have fallen much earlier and the Channel ports would have been within the grasp of the enemy. While Liège was still holding out and the Fr. were advancing into Alsace, King Albert on Aug. 21 decided to retire on A. so as to be in a position to attack the flank of the advancing enemy. Early in September, however, Ghent had fallen and large enemy reinforcements were moving S. A fine sortie from A., directed by King Albert himself, had the effect of scattering the Ger. forces and delaying the reinforcements. But the delay was only temporary and in Oct. General French learned to his surprise that A. was the enemy's great objective and that it was in such imminent danger that the Belgian Field Army was to be retired in the direction of Ghent so as to protect the coast-line. It was believed, however, by the Allies that the tn. could resist a siege for about six days, but that the Belgians could not resist an advance on the Channel ports. In these circumstances Sir John French's plan was to turn the N. flank of the enemy so as to enforce his retirement and at the same time to pin down on the existing line as many enemy corps as possible. Whitehall, however, ordered direct relief operations to be undertaken. Von Beseler, the Ger. general, had only 100,000 troops. Hence it is suggested by Sir John French that the Ger. staff deliberately left the tns. between A. and Ostend open so as to tempt the Allies into a dangerous extension of their already attenuated line. Had Von Beseler acted with more boldness, A. might

(Livy, viii. 21), under the name of Tarracina (*q.v.*).

Anytus, a wealthy leader of the Athenian ... Anthemion. ... helped to ... Tyrants. ... of the accusers of Socrates (399 B.C.) and the Athenians, on repenting of the latter's death, sent A. into exile.

Anzacs. The Australian and New Zealand Army Corps which served in the Great War, the word being formed of the initial letters of the Corps. The 'Anzacs'' most conspicuous service was rendered in the ill-fated *Gallipoli Campaign* of 1915. The Corps effected a heroic landing under intense difficulties, at Gaba Tepe, later named Anzac Cove in memory of the exploit. (April 25, 1915. 'Anzac Day'). (*See also* GALLIPOLI CAMPAIGN.) After the evacuation they fought in Macedonia, on the Salonika front, in Egypt, and in France. In Egypt, a number of A. formed the force which, under Sir Charles Dobell, attacked the Turks at Gaza (1917). In France they fought with characteristic dash in the Somme Battle, 1916, notably at Pozières.

Anzengruber, Ludwig (1839–89), Austrian dramatist and novelist. Born at Vienna and became an actor at 19. His best work, mainly dealing with peasant life, was produced after 1867, after he had returned to clerical work in Vienna. *Pfarrer von Hirschfeld* ... made him ... ollowed by ... *elschreiber*, ... *Wucherers*, ... 74; *Hand* ... *chandfleck*, ... 1878; *Ein* ... *gewohnten Gleis*, 1880; *Der Sternsteinhof*, 1885; *Mahl und Stein*, 1889. His collected works were first pub. in 1890, and a biography by Bettelheim in 1890.

Anzin, tn., France, on the Scheldt, 1 m. from Valenciennes, in the dept. of Nord. It is the largest coal-mining centre in the country, and has extensive manufs. of machinery and metal industries. Pop. 14,700.

Anzio, Porte de (anct. Antium), seaport of Italy, 30 m. S.E. of Rome. It was a fishing tn. and a bathing resort of the Roms. Nero and Caligula were born here. The modern tn. dates from the restoration of the harbour in 1698. Pop. 3500.

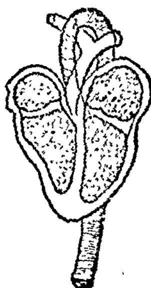
Aoki, Siuzo (1844–1914), Japanese statesman. Born in Choshiu. Secretary to Japanese legation at Berlin, 1873; minister there, 1874, and again in 1892; foreign secretary of state in Japan, 1885, 1889, and 1898. In 1897 he conducted important negotiations regarding treaties with European powers; later became minister of foreign affairs in Japan, and in 1906–7 was ambassador to the U.S.A.

Aomori, or **Awomori**, seaport at N. end of Honshiu, Japan. It has a fine harbour and does a considerable trade. Pop. 1500.

Aonla, tn. of United Provs., India, 21 m. S.W. of Bareilly. It contains the tomb of the Rohilla chief, Ali Mohammed, who *d.* in 1751. Pop. 14,000.

Aorist (Gk. ... Gk. tense ... past time. ... past tense, 'died,' 'went,' 'did,' and is specially suitable for the narrative style. The distinction between first and second A. was not observed in practice.

Aorta, the large blood-vessel leading from the left ventricle of the heart and sending arterial blood to all parts of the body. It ends by bifurcating into the common iliacs at the fourth lumbar vertebra.


AORTA

Aosta, cathedral tn., N. Italy, in the prov. of Turin, 50 m. N. of Turin. Its anct. name Augusta Prætoria was derived from the colony founded there by Augustus in 25 B.C. The tn. possesses many relics of the Rom. settlement, amongst them the triumphal arch of Augustus, the prætorian gate, ... an amphitheat ... walls are very ... the Roms. The ... the fourteenth century. A. was the bp. of Anselm, Archbishop of Canterbury, and the scene of some of the labours of St. Bernard, who was archdeacon. The tn., though beautifully situated in a rich fruit-growing dist., is not altogether prepossessing in appearance, being cheerless and of irregular formation. The Val d'Aosta, the delightful valley between the Pennine and Graian Alps, produces abundance of fruit and cattle, and has extensive mineral deposits.

Apaches, formerly a fierce and predatory tribe of N. American Indians, inhabiting parts of N. Mexico, Arizona, and Texas. At one time very numerous, they have been largely ...

been applied to that peculiar criminal type, the Paris hooligan.

Apaffi: (1) Michael I., Prince of Transylvania (1632–90). Chosen prince in 1661 and remained faithful to the Porte, under whose protection he reigned till after the siege of Vienna in 1683. In 1687 he obtained a declaration of Transylvanian independence under Austrian protection by a treaty with the Emperor Leopold I. (2) Michael II., son of the above (1677–1713). Succeeded to a war with the Turks, who were supporting Count Tökölyi's claim to the Transylvanian throne. A., with the aid of Austria, was victorious. In 1699 Transylvania was incorporated with Hungary.

Apalachicola: 1. A riv. of Georgia, U.S.A. The A. has two main branches, the Chattahoochee and the Flint, which rise in Georgia and meet at the extreme S.W. of the state, and that part which then flows through Florida into the Gulf of Mexico is called the A.; length 70 m. 2. A city and port of Franklin co., Florida, U.S.A., on riv. and bay of same name. Noted for oyster, tarpon, and other fisheries. There is a monument to Gorrie, the physician, who discovered the cold-air process of refrigeration. Pop. (1925) 3003.

Aparri, port of Cagayan prov., Luzon, Philippines, on estuary of Cagaya R. The only serviceable harbour on the N. coast of the is. Pop. 18,252.

Apatin, a tn., Hungary, on the Danube, 49 m. S.W. of Thesiopol and 125 m. S. of Pesth. Has a considerable trade in silk, hemp, and madder, and manufs. woollen cloth. Pop. 14,000.

Apatite, a mineral, very widely distributed, which consists mainly of phosphates of calcium. Most varieties correspond to the formula $3Ca_3(PO_4)_2 + CaF_2$ or $Ca_3(PO_4)_2 + Ca_2(PO_4)F$, but sometimes the fluorine is replaced by chlorine. It crystallises in a *hexagonal* form, and crystals are sometimes found over a foot in length. When found in large masses, as in Norway and Canada, it is mined for the extraction of phosphates. It is always a constituent of gneiss, granite, and diabase, usually in minute crystals, and probably the phosphates in the soil are due to A. from the disintegration of such rocks.

Ape, a term used to denote (1) the [illegible] the short-tailed [illegible] monkeys and [illegible]; (2) more specifically, the most man-like forms, such as the chimpanzee, the orang, the gorilla, and the gibbons.

Apeldoorn, tn., Netherlands, prov. of Gelderland, 17 m. N. of Arnheim. Manufactures paper extensively, also blankets and woollen cloth. In the neighbourhood is Castle Loo, the royal hunting-lodge. Pop. 57,892.

Apelleafis, or Apellites, a sect of heretics. Their name is derived from Apelles, their founder, who lived during the second century. He is mentioned by Augustine, Epiphanius, Tertullian, and Eusebius.

Apelles, a Gk. painter of the fourth century B.C. He was *b.* at Colophon, in Ionia, and studied at Sicyon, near Corinth. Becoming a favourite at the court of Philip of Macedon, he was appointed by Alexander to be his portrait painter. As none of his works now remains, it is impossible to judge them other than by reputation, but A. seems to have been particularly skilful in drawing, composition, and simple but graceful colouring. Among his greatest pictures were 'Alexander wielding a Thunderbolt,' the 'High Priest's Procession at Ephesus,' and 'Aphrodite *Anadyomene*.' His idealism must have been remarkable, and he was renowned for his skill in technique.

Apellicon lived in the first century B.C., and was, according to Strabo, a native of Teos, but he was admitted as a citizen of Athens. He was a Peripatetic philosopher, and a great collector of books. He purchased the library of Aristotle containing the manuscripts of that philosopher and of his pupil Theophrastus; but his library was taken to Rome by Sulla when Athens was conquered 86 B.C.

Apelt, Ernst Friedrich (1812–59), Ger. philosopher, *b.* at Reichenau; studied at Jena and Leipzig; became professor of metaphysics at Jena in 1840. He followed the methods of Kant, Jacobi, and Fries. Author of *Epochen der Geschichte der Menschheit*, 1845; *Theorie der Induktion*, 1854; *Religionsphilosophie*, 1860.

Apennines (Lat. *Appenninus*), a long mt. range, often called the 'backbone of Italy.' Starting from the Maritime Alps, the A. run down the whole length of the peninsula, and are continued through Sicily, beyond which a line of submarine elevations connects them with the mts. of N. Africa. Their name is probably derived from the same root 'pen' which is found so frequently in Celtic lands (as in Penmaenmawr). Though spoken of by early writers as a single range, the A. are now generally classed as N., Central, and S. The N. div. includes the Ligurian, Tuscan and Umbrian ranges, of which the first runs round the Gulf of Genoa, from the Maritime Alps to the valley of the Magra, near Spezia. Its highest point is Monte Bue, 5915 ft. Between the Maritime and Ligurian

mts. and the sea lies the narrow strip of coast known as the Riviera, while on the N. they send off many tributaries to the Po. The Tuscan A., reaching across the peninsula to the sources of the Tiber, are slightly higher than the Ligurian, Monte Cimone rising 7103 ft. A spur on the W., called the Alpi Apuane, supplies very fine marble, at Carrara. The chief rivs. of the Tuscan range are the Arno on the S., and the Panaro, Secchio, and Reno on the N. The N. end of the Umbrian range gives rise to two rivs. famous in history, the Tiber and the Metaurus, which rise within a few miles of each other, but flow into different seas. The S. extremity of the range is not easy to define, as it becomes complicated with the great mass of the Central A. These, the loftiest in the peninsula, are broken up into sev. chains, of which the Gran Sasso has Monte Corno, 9580 ft., and Monte Amaro, 9170 ft., while the Sibillini and others have sev. peaks of 7000 and 8000 ft. The southern A. are very irregular, their chief ranges being the Matese (with Monte Miletto, 6725 ft.), the ... Pollino, 7325 ft.), ... In these last, as ... granite, gneiss, and other anct. rocks are predominant; elsewhere the whole system is mainly of Triassic and later formations, a great part being limestone. The A. are not metalliferous, but furnish valuable stone. On the W. there are many traces of volcanic agency, but the only craters now active are those of Vesuvius, Etna, and Stromboli. The highest peaks of the A. are covered with snow during great part of the year, but there are no glaciers. In former times there were large forests of pine, oak, chestnut, and beech, containing many wild animals, but much of the timber has been felled, and only wolves are now troublesome, though a few bears still remain. Much more dangerous were the brigands who flourished, especially in S. Italy, down to very recent times.

Apenrade, a seaport and watering-place in Schleswig, on an inlet of the Lettle Belt; has a good harbour and considerable transport trade, beside fishing, shipbuilding, and other industries. It was ceded to Prussia with the rest of Schleswig in 1864.

Aperients, medicines which stimulate the natural action of the bowels. Sometimes the term is applied ... those ... slightl ... bowels ... be div ... which ... ence on the bowel muscles, as figs, prunes, olive oil, etc.; (2) purgatives, which increase the movements of the intestines, and mildly stimulate the glands, as castor oil, aloes, etc.; (3) drastics, which act more intensely, increase the intestinal fluid, and cause painful fluid motions, as jalap, podophyllin, and large doses of purgatives; (4) hydragogues, which cause free secretion from the intestinal glands, remove much serum from the blood-vessels, and cause watery motions, as croton oil and large doses of cream of tartar, Epsom salts, Glauber's salt, etc.; (5) cholagogue purgatives, which stimulate the liver and increase the bile, producing greenish liquid motions, as aloes, rhubarb, iridine, etc.

Apetalous Plants are those in which the corolla is suppressed.

Apex Beat, the stroke of the A., or point, of the heart against the pericardium, through which it can be heard and felt externally on the wall of the chest just below the breast. Deviations in the position or force of this beat afford important indications of pathological changes in the heart.

Aphasia, the partial or complete loss of the power of speech or of expression by writing, or of understanding spoken or written words. The term is not applied when the power is lost through lesions of the peripheral nerves or organs, but only when the central nervous system is affected. The memory-stores which enable us to use and understand the language we have so gradually acquired correspond with certain portions of the brain, and a consideration of the process of acquiring the power of speech will go far to explain why A. is so often restricted to certain functions connected therewith, while others remain intact. The child understands words before he can speak; these percepts are stored away in the brain in the first temporal convolution of the left-hand ... sons, and ... sons. La ... the co-ordinated movements of the tongue, larynx, etc., necessary to pronounce a word. The memories of these movements are stored away in the foot of the third left frontal convolution. When he learns to read, ... e words are ... tex, and so ... nstant com- ... portions of ... image of a ... memory of the spoken word and of the movements necessary to give it utterance. If a lesion in any one of these areas occurs there is a corresponding loss of power of expression or understanding. Thus the patient may recognise a word when seen, but be unable to

originally of Oriental origin. In the E. she was known by the names of Ishtar, Ashtoreth, Astarte, and practically all the attributes of Gk. mythology are ascribed to her in her earlier forms; her attributes of fruitfulness, her connection with the sea and moon all being emphasised in the Eastern ideas. The chief places of her worship were Cyprus and Cytherea. The sparrow and the swan, the rose, the poppy, and the lime-tree, were all sacred to her. Her most famous statue was that of Praxiteles at Cnidus, others being that of Melos (Milo) at Paris, the Capitoline Venus at Rome, and the Medicean Venus at Florence.

Aphthæ (Gk. ἄφθαι, eruption) is a disease occurring chiefly in infants, and is commonly called *thrush.* It is a parasitic disorder, and a minute fungus grows on the mucous membrane of the mouth and gullet, showing white patches inside the lower lip and under the tongue. It arises from lack of cleanliness and good nourishment. It is not usually serious, and cleanliness is the primary cure, with attention to diet and local application of glycerine and borax.

Aphthonius, who lived at the end of the third and beginning of the fourth centuries, was a Gk. rhetorician of Antioch. He was the author of forty Gk. fables and of *Progymnasmata,* an introduction to the study of rhetoric. It was first printed by the elder Aldus with the other rhetoricians, *Rhetores Græci,* Venice, 1508, and was in common use for several centuries.

Apia, a seaport on the N. coast of Upolu, Samoa, capital until 1914 of Ger. portion, but assigned to New Zealand under mandate by the Treaty of Versailles. In March 1889 four Ger. and American ships were sunk here by a hurricane. It was visited by eighty-eight ships of 90,000 tons in 1923. Copra and cocoa beans are exported. Pop. (1925), 1400.

Apian: (1) Peter (1495–1552), an astronomer, and, we may add, as trologer, *b.* at Leipzig. His real name was Bienewitz. *Biene* in Ger. signifies 'a bee,' whence the Lat. *apianus.* He was in favour with Charles V., who gave him an order of knighthood and the title of count, as well as more substantial rewards. He is principally remarkable for his observations of comets, and is said to have been the first who observed that their tails are generally turned from the sun; but this had been previously noticed by Fracastoro. He also attempted the solution of astronomical problems by mechanism as described in his *Opus Cæsareum,* and pointed out, in his *Cosmographia,* the use which might be made of lunai [illegible] ing long.; he *d.* [illegible] he [illegible] Phi [illegible] r, succeeded his [illegible] which place he [illegible] in 1558 on account of his embracing the Protestant religion. Philip enjoyed some celebrity as an astronomer and mathematician, and *d.* professor at Tübingen in 1589.

Apiary (Lat. *apis,* bee), a place for keeping beehives. The name is derived in the same way that an aviary is taken from *avis,* a bird. Beekeepers disagree as to the best position of the A., but all maintain it should be impervious to winds.

Apiaster, an old name for the bee-eater in general: now confined to *Merops apiaster.*

Apicius, the name of three Romans celebrated for their gluttony. The first lived *c.* 92 B.C. The second *c.* A.D. 14, and the third about the middle of the first century.

The second is the most famous. M. Gabius A., who, after squandering his fortune in gluttony, committed suicide because he would not be able to satisfy his appetite on the pittance left. His name has become proverbial of gluttony. (Tac. *Anns.* iv. 1; Dio Cass. lvii. 19; Athen. p. 7; Pliny, viii. 209, ix. 66, xix. 137; Juv. iv. 23.)

Apiin (Lat. *apium,* parsley), the peculiar principle of parsley, obtained from it by solution in water. It crystallises in colourless needles, without taste or smell. It is soluble in boiling water or alcohol, insoluble in ether.

Apiocrinidæ (Gk. ἄπιον, pear, κρίνον, lily), a family of crinoid fossils of the order Articulata. The stem is long and rounded, the calyx unsymmetrical and composed of heavy plates. They occur chiefly in the Jurassic and Cretaceous systems.

Apion, a Gk. grammarian who studied at Alexandria and who lived during the reigns of Tiberius and Caligula. He was a determined opponent of the Jews, and was sent on one occasion to Rome at the head of an embassy to complain to the Rom. emperor (Caligula) of the Jews, and was the author of a number of works, only fragments of which remain. The story of *Androclus and the Lion* (Gellius, v. 14), and the *Dolphin at Dicæarchia* (Gellius, vii. 8); with fragments from the work against the Jews preserved by Josephus in his reply.

Apis, the sacred bull of Memphis. The origin of the worship of the bull Hap, called by the Gks. A., is unfortunately hidden in obscurity. He is said to have been held in honour by Mena, the first historical king of

Egypt, and to have been raised to god-ship by Kalekhos, a king of the second dynasty. Herodotus describes A. as being 'the calf of a cow incapable of conceiving another offspring,' and that 'lightning descends upon the cow from heaven and from thence it brings forth A.' Living and dead A. was closely associated with Osiris. A. became known by the Gk. name of Serapis, and was accounted the husband of the goddess Isis. Special marks were found on the sacred bull A., *e.g.* it was black, had a white square on its forehead, on its back the figure of an eagle, and on its tongue a beetle. It was cared for with all honour; from its manner of approach, from its movement in its stall, from the manner in which it received food from visitors, the auguries were taken. Its birthday was celebrated by a seven days' feast. Its death plunged the whole kingdom in mourning. It was the reincarnation of the god Osiris, and was therefore worshipped as such. From modern researches we find that the bodies of the sacred bulls were mummified with all care, and at the Serapeum two galleries measuring together 1200 ft. were found in which the bodies of the sacred bulls had been placed.

Apium, a genus of plants belonging to the Umbelliferæ, found in ditches in Britain, and nearly every part of Europe. *A. graveolens*, the only important species, is the celery; in its wild state it is poisonous, but when cultivated it becomes harmless.

Aplanatic Lens, a lens which is free from spherical aberration.

Aplerbeck, a tn. of Westphalia, Prussia, 4 m. S.E. of Dortmund. Contains coal and iron mines. Pop. 10,940.

Aplustre, the beaked ornament
hat was placed at the stern of anct.
hips.

Apnœa, a technical term for the
ispension of breathing. It denotes
ne prevention of breathing owing to
ne presence of too much oxygen in
e blood.

Apocalypse, lit. trans. a revelation,
., something revealed only to a
osen person. The term is usually
plied to the last book of the N.T.,
ich is often referred to as the A. of
John. In the Eng. Bible, how-
r, the name the Revelation of St.
n the Divine is given to this book.
term, however, was used at a
h earlier period by the Jews to
ate a number of writings which,
e form of parables and prophecy,
supposed to reveal the end or
uture state of the world. This
lyptic literature is found in both
.T. and the N.T., and was origi-
the outcome of the Hellenistic
Jews. It differed very essent
from the prophetical writings, s
the prophets emphasised the need
repentance, and the utter wickedn
of the times; while the apocaly
writers despaired of the present,
put their whole trust in the deliv
ance and reward which was to be t
guerdon of the sufferings and sorro
of the present. Among the canonic
books of the O.T. we may mention a
apocalyptic writings parts of Isaia
and of Ezekiel and the book of Danie
amongst the uncanonical, the book o
Enoch and the Psalms of Solomon
We find also in Christian times a
number of writings which are classed
as apocalyptic writings, and which
are outside the canon. Amongst
those in the canon are, parts of St.
Mark and of Thessalonians and the
Revelation; outside the canon we find
a number of books, altogether about
a dozen, which are also called apocalyptic writings, and amongst which are found the Shepherd of Hermas, and the Revelations of Bartholomew.

Apocalyptic Number, or 'the Number of the Beast,' is the mystical number 666 (*see* Rev. xiii. 18). There have been various interpretations of this mystery. In Gk. and Heb. the letters of the alphabet were used for numbers, and so 'the number of the beast: for it is the number of a man' was the value of the letters composing the name. The most generally accepted solution is 'Neron Kesar,' the Heb. for the Lat. 'Nero Cæsar.' In anct. Heb. the vowels 'e' and 'a' are not represented, but 'o,' being a long vowel, is. The value of the letters N R O N K S R is therefore 50 + 200 + 6 + 50 + 100 + 60 + 200 = 666. Another interpretation has been made from the Gk. word 'Lateinos,' meaning the Rom. empire.

Apocarpous Fruits are those which are formed from a single, unfused carpel. These include sev. varieties, as the achene (*e.g.* buttercup), legume (*e.g.* pea), drupe (*e.g.* plum).

Apocatastasis, in the theological sense the extension of the kingdom of God over all the earth at the appointed time, *i.e.* the ultimate conversion of the whole world to the Christian faith.

Apocrenic Acid, an acid formed by the oxidation of crenic acid. It is found in rotting vegetable matter, and is an intermediary step by which the organic substance can once more be absorbed by living plants.

Apocrypha, a word in its wider application used to denote spurious Heb. literature, but technically restricted to mean books which were included in the Septuagint (Gk. O.T.) and the Vulgate (Lat. O.T.), but were not included in the Heb. Canon. A

general reference to the word A. means usually the A. of the O.T., but there is also much apocryphal literature in connection with the N.T.

The A. of the O.T. as used by Protestants includes the following books: First Esdras, Second Esdras, Tobit, Judith, additions to Esther, Wisdom of Solomon, Ecclesiasticus, Baruch, the Song of the Three Holy Children, the History of Susannah, Bel and the Dragon, the Prayer of Manasses, 1 Maccabees, 2 Maccabees. The sources of these books are various, some showing Persian and Grecian influences, whilst others remain entirely Hebraic. Most of the books date from the first or second century B.C., and fall practically into three divs.: (*a*) Historical, (*b*) Legendary, (*c*) Didactic or Philosophical.

The books of the A., whilst not of the same value as the canonical books, nevertheless give us a glimpse into the religious life and ideas of the Jewish race. They show us a race rising from misfortune with unshaken faith and relying always on the promise given them that they were still the chosen race and must ultimately triumph. They give us also the beginning of the change from the law of the old dispensation to the law of the new. A transition from the old Jewish standpoint to the new.

The early Gk. fathers gave as much attention to the books of the A. as they did to the canonical books until the Council of Laodicea. After this council the books of the A. were treated as being strictly uncanonical. But in the Western Church Jerome declared that all books outside the Heb. canon were apocryphal, whereas Augustine declared that the apocryphal books simply implied those books whose origin was unknown or obscure. Another view declared that the books of the A. were valuable for their moral teachings, but were not to be regarded as a part of the canon. Diverse opinions were held right down until the period of the Reformation. At the Council of Trent the opinion of Augustine was strongly upheld and the books of the ancient Latin Vulgate were declared canonical and sacred. That is, the whole of the books of the A., with the exception of First and Second Esdras and the Prayer of Manasses, were declared of equal value with the canonical books.

The ... , remained firm i... the books of th... ere sacred and ... declared that all books save those of the Hebrew canon should be set among the A., that is, books 'without authority or belief.' Luther denied them to be as sacred as the Scriptures, but deemed them valuable because of their good moral teaching. This later attitude seems to be the one more closely adopted by the Protestants, since in the early Protestant editions of the Bible the A. is given, but given apart from the canonical writings. Further, the sixth article of the Church of England states that other books of the church may be read for the sake of example and teaching, but not for the establishment of doctrine. The A. is regarded by a large number of orthodox people, however, not merely as uncanonical, but as inimical to the inspired word of God.

In addition to the A. included in the Septuagint there are also a number of books included in apocryphal literature. Amongst these may be mentioned History of Joannes Hyrcanus, Book of Jubilees, Books of Adam, Jannes, and Jambres, Joseph and Asenath, Perke Alsoth.

Apocrypha of the New Testament, The, numerous unauthenticated ...

O.T. ('Biblia') and the books of the New ('Apostles'). The Epistle of Barna... ive come from ... mpanion, but t... n shown to be ... to prove the c... Judaism. The S... supposed to have been written by that Hermas who is mentioned by Paul in the Rom. epistle. It consists of a series of orisons, but its chief interest lies in the fact that it gives us some insight into the working and doctrine of the early Rom. Church. The Gospel of Peter and the Revelation of Peter: both these books are unauthentic. The Protevangelium of James is an account of the wonders dating from the birth of Mary to the birth of our Lord. The Gospel of St. Thomas deals with the infancy of Christ, and gives accounts of the miracles of that period. The Gospel of Nicodemus is divided into two parts. The first contains an account of the trial of Christ before Pilate. This part is called also *Acta Pilata*. The second part is supposed to be the narrative of Simeon and his two sons, who rose from the dead after the resurrection of Christ and who relate the happenings in Hades on the descent of the Christ.

Apocynaceæ, a natural order of

monocotyledonous plants which are chiefly tropical and usually form shrubs. All species contain latex, generally of a poisonous nature, in two cases being nux vomica and the tanghin poison. The characteristics of the flowers of this order are that they are symmetrical, monoclinous, in whorls of four or five; the fruit consists of two follicles or a berry. The formula is K(5)C(5)A5G(2).

Apodes, an order of fishes. According to the Linnæan system it includes all those without the ventral fins. Cuvier restricts the order to those which, besides this character, are likewise malacopterygious, and according to this classification the eel, muræna, and gymnotus are examples.

Apodictic, a logical term applied to a conclusion which is necessarily true, *i.e.* the opposite of which is impossible.

Apogamy is the curious condition met with in some ferns, *e.g.* in *Nephrodium Filix-mas*, the shield-fern. In this case the new fern-plant arises directly as a bud from the prothallus without aid of sexual organs. In other cases A. is effected parthenogenetically, the new plant arising from an unfertilised oosphere. *See* also APOSPORY.

Apogee (from Gk. ἀπό, from, and γῆ, the earth), another term for *aphelion* (*q.v.*) and used more particularly in speaking of the moon.

Apogeotropism, in botany, the tendency of the main organs of plants to grow in a direction opposed to the force of gravitation, *i.e.* upward from the surface of the earth. Normal stems are apogeotropic.

Apol, L. F. H. (*b.* 1850), a Dutch painter. He accompanied the William Barents Arctic expedition of 1880, and produced many pictures of winter scenes both in Holland and in the Arctic regions.

Apolda, a Ger. tn. and political dist. in Thuringia. About 9 m. N.E. of Weimar. Manufs. cloth and hosiery. Has also dyeworks, bell foundries, and manufs. steam engines and bicycles. Pop. about 25,700.

Apollinaire, Guillaume (1880–1918), famous Fr. writer. His real name was Wilhelm Apollinaris de Kostrowitzky, he being the natural child of a Polish woman and a priest of Monaco. He was *b.* in Rome. He wove legends on his early years and all that is certainly known of him is that he had travelled much before he came to Paris in 1902 and allied himself with some of the younger and more advanced writers and artists. He was either the inventor or the chief protagonist of Cubism. He conducted a regular department in the famous French magazine *Mercure de France*. When the world war broke out he served at the front, and was so badly wounded in the head that his skull had to be trepanned twice. He wrote fantastic prose and verse with equal facility. Principal works: *Alcools* (poems) 1913; *Calligrammes* (poems) 1918; *Contes Choisis*, 1923.

Apollinaris, the Younger, Bishop of Laodicea in Syria. A bitter opponent of Arianism. This controversy took him so far that he even opposed the orthodox position of the Catholic Church. His denial of the existence of the *human* element in Christ's nature led to his condemnation by Catholic synods. He *d.* about 390.

Apollinaris Sidonius (*d. c.* 488), a Christian author and bishop of the fifth century. *B.* in Lyons about the year 434, of noble family, he was connected by marriage to the Emperor Avitus. His learning, however, saved him when Lyons was captured by Majorian, as it did later when Rome fell into the hands of the Goths. He became Bishop of Clermont. A number of his works are still extant.

Apollinaris Water, an alkaline mineral water from the A. Spring in the valley of the Ahr, Rhine Prov., Germany.

Apollo, the god of the ideal arts and activities in classical mythology. A Gk. legend describes him as the son of Zeus and Leto. Leto, wearied by her flight from the jealous anger of Hera, sank exhausted on the isle of Delos and gave birth to A. The is., heretofore a barren rock, sprang to life and covered itself with golden flowers in honour of the birth. A. is represented as being many-sided. Homer describes him as a sender of plagues; he is also described as the god of prophecy, the god of shepherds, the god of music, and the god of medicine. He is held in honour as a great athlete, the winner of the first Olympic race, and the founder and builder of cities. Troy is supposed to have been built by his aid. As A. Delphinios he was held in reverence by sailors as the god of light who helped them over the dark and dangerous sea. As the god of light he was also the god of purity, and demanded purity of worship from his followers. He was also the god through whom the taint of crime could be removed. In later Gk. mythology he is the sun-god, but earlier mythology has a distinct sun-god, Helios. The bow and the lyre are the usual attributes of A.; the bay, the palm, the roe, the swan, the snake, the mouse are all sacred to him.

The most famous representation of A. is the A. Belvedere, an imitation of

an early bronze statue, which shows him, bow in hand, driving back the Gauls from his temple at Delphi. In the A. Citharœdus, A. is represented in flowing robes and almost feminine in form. The usual statue of Apollo represents him as the type of the ideal Gk., handsome, tall, and perfectly proportioned.

Apollo of Rhodes, a colossal bronze figure of the sun-god, reckoned among the seven wonders of the anct. world. It is said to have been the work of Chares of Lindus and to have been set up by the Rhodians about 280 B.C. in gratitude for the successful defence of the city against Demetrius. The height was probably about 90 ft., and the work is stated to have occupied the sculptor twelve years. In 226 B.C. it was overthrown by an earthquake, and the metal was sold by Arabs when they captured Rhodes in A.D. 653.

Apollodorus, an Athenian painter of the end of the fifth century B.C. He introduced some innovations in perspective and light and shade. His works include an Odysseus, and an Ajax struck by lightning.

Apollodorus, a grammarian of Athens who *fl.* *c.* 140 B.C. He wrote a book on the mythology of the Gks., in addition to a number of grammatical treatises and a book on geography. His extant *Bibliotheca* is regarded by authorities as only part of a larger book which has been lost.

Apollodorus, a famous architect of the second century. He was *b.* at Damascus. He became a favourite of the Emperor Trajan, for whom he constructed a bridge over the Danube. He also designed a number of build-ngs and triumphal arches. He offended the Emperor Hadrian by his outspoken denunciations, and on Hadrian's accession he was put to eath on trivial charges.

Apollonia: (1) Anct. city of Illyria, ear mouth of R. Aous. Colonised by orinthians and Corcyræans, and mous as a Rom. place of learning. Anct. city of Thrace, on the xine. Colonised by emigrants from esia. The famous statue of Apollo s removed from here to Rome by eullus, 72 B.C. The site is now upied by Sisceboli. (3) Anct. port yrene, now Marsa Suza.

pollonicon (from Apollo), a power-chamber-organ with both keys barrels, manuf. by Messrs. Flight Robson in London, and exhibitel hem in 1817. It could be played n organist, and was also a self-ng instrument, being provided wo revolving cylinders studded hose of a barrel-organ. It had ive stops and 1900 pipes.

Apollonius of Perga, a celebrat geometer of the Alexandrian scho He was born some twenty-five yea later than Archimedes, *i.e.* *c.* the ye 262 B.C. He is classed with Euclid an Archimedes as one of the founders o mathematical science. His chief wor is a book on conics which gained fo him at the time the title of the 'great geometer,' and which has preserved his fame. His book on conics is the only one of his works which has come down to us, although the names of others have been preserved by later writers.

Apollonius of Rhodes, a Gk. poet and grammarian who *fl.* between the years 222 and 181 B.C. His most famous work was a poem on the legend of the Argonauts called the *Argonautica*. He received his title of Rhodius from the people of Rhodes, amongst whom he lived for some considerable time after being driven from Alexandria. He left Rhodes in order to become librarian at the museum at Alexandria, whither he was recalled. His poem the *Argonautica* was a favourite with Rom. writers, and although in later days it has received somewhat harsh criticism, such criticism is not altogether deserved.

Apollonius of Tyana, a Gk. philosopher. He was *b.* a few years before the Christian era. He studied at Tarsus, and became a follower of the doctrines of Pythagoras. He claimed for himself a divine mission, and gathering around him a number of disciples, he travelled widely. He travelled through Nineveh, Babylon, and India, and came under the influence of Oriental teaching. When he returned he was received with great honour, and many miracles were ascribed to him. He himself only arrogated prophetic vision. He was patronised by Rom. emperors, and during the height of his fame traversed W. Europe. Later, after being accused of conspiring against Nero, he retired to Ephesus, where he opened a school, and where he *d.* at the age of nearly one hundred years. By Blount and Voltaire he has been held as the superior of Christ. His biographer Philostratus gives an account of his life, which must, however, be stripped of its exaggeration and fiction before we can see a glimpse of the earnest striver after a higher life.

Apollonius Dyscolos, surnamed the Surly, a famous grammarian of Alexandria. He lived during the reigns of Hadrian and Antoninus Pius. He was the first grammarian who introduced a system into the grammatical treatment. He is called 'grammaticorum princeps,' by Priscian, by whom he is followed somewhat

closely. His works have been edited by Bekker and Schneider.

Apollonius of Tyre, the name of a mediæval tale which is supposed to have a Gk. origin. The first mention of the tale seems to be about the latter end of the sixth century. The story relates how A. of T., having solved the riddle set him by King Antiochus, has to flee in order to escape the wrath of the king. In Cyrene he married, and on the death of King Antiochus, he goes to claim Antioch, to which kingdom he is heir. On the voyage his wife apparently dies in giving birth to his daughter. The corpse is thrown overboard and the daughter left at Tyre. After fourteen years of vicissitudes the three, husband, wife, and daughter, are miraculously restored to each other. The story had great popularity during the middle ages in almost every country. Shakespeare used it in his drama called *Pericles*.

Apollos, an Alexandrian Jew described in the Acts of the Apostles (xviii. 24–28). He is said to have been an eloquent speaker and a man mighty in the Scriptures. Until his 'conversion' by Priscilla and Aquila he appears to have preached only the baptism of John. There remains still some doubt as to exactly what form this 'conversion' took, since he appears always to have been a Christian. He became a follower and fellow-teacher with Paul, and a great deal of his work was done in Corinth, where he gained great influence (1 Cor. iii. 4). It is held by some that previous to his conversion he wrote the *Wisdom of Solomon*, while Martin Luther believed him to be the auther of the Epistle to the Hebrews, a view which has received much support.

Apollyon (Gk. 'Ἀπολλύων, meaning 'destroyer'). This name is given in Rev. ix. 11 as a translation of the Heb. 'Abaddon,' 'the angel of the bottomless pit.' A. forms a striking figure in Bunyan's *Pilgrim's Progress*. His identification with the Asmodeus of Tobit seems doubtful.

Apologetics. From the earliest ages the Christian faith has been subject to attacks, varying in character with the changes of thought produced by centuries of national, eccles., and philosophical strife. These attacks have in turn called forth defensive works, written from many different points of view, and often disagreeing with each other in important respects, but still having one common aim, that of upholding the main doctrines of Christianity. Such defences have received the general name of A., from the Gk. ἀπολογία, a defendant's personal reply to his accuser, *e.g.* Plato's *Apology of Socrates*. Of course, defence has often taken the form of a counter-attack, as when we find Paul denouncing the grossness of paganism. A full history of Christian A. would trace the moral and intellectual development of Europe, Asia Minor, and N. Africa during two thousand years, with its continuous effect upon religious thought. Arguments accepted as profound by one age often appear trivial to another, having been founded on premises which fuller knowledge have disproved.

In early ages we naturally find the Christians defending themselves against two main lines of attack, those of Jewish and pagan opponents. By the former they are looked upon as renegades and blasphemers, the latter accuse them of law-breaking, sedition, impiety, atheism, secret immorality, and 'foolishness' (1 Cor. i. 18). In reply to the former, O.T. history and prophecy were largely employed by Paul and his colleagues, while the Gks. were referred to the highest philosophy of their own writers, which inculcated pure morality, an exalted idea of the deity, and a belief in the immortality of the soul. This was pointed out not only as an acceptable form of natural theology, but as being supported by divine revelation. Some of Paul's chapters (*e.g.* Rom. xiii.) seem intended as specific answers to some of the pagan accusations. Among the most famous apologists of the early church were Justin Martyr, Origen, and St. Augustine. The latter's work, *De Civitate Dei*, did much to establish the W. church on a permanent footing.

During the middle ages, while pagan enemies had become extinct, Jewish and Moslem authors well instructed in Gk. philosophy took up new lines of attack. Christian writers had maintained that faith and reason must necessarily be in harmony, but now began the controversies concerning 'natural' and 'revealed' religion which have lasted to the present day. Among the great Moslem and Jewish names are those of Avicenna, Averroes, Maimonides, and Jehuda Halevi: on the Christian side Anselm, Abelard, Albertus Magnus, and Thomas Aquinas. The main result to Christendom of these controversies was what is known as the 'Thomist compromise,' which declares that certain doctrines are beyond the sphere of reason. The 'nominalists,' William of Occam, Buridan, and others, going further still, asserted *all* matters of faith to be above argument. The Church of Rome, on the whole, sided with the Thomists. Since the revival of learning, the growth of modern

philosophy and science has had immense effect on religious thought. The rise of deism, a new presentation of 'natural theology,' was contemporaneous with that of Jansenism, which sought to put new wine into old bottles by accommodating the ideas of Augustine with the modern claims and teaching of the Vatican, and also to some extent with certain tenets of Protestantism. The greatest of the Jansenists was Blaise Pascal, a staunch Christian and Roman Catholic, yet his colleagues of Port Royal were subsequently persecuted as heretics at the instigation of Rome. Deism may be looked on as a natural reaction among those who had imbibed Protestant ideas of freedom against the extreme views held by some of the 'supernaturalists,' and this, with pantheism and other allied forms of teaching, had many advocates, some of them men of high abilities—Lord Herbert of Cherbury, Spinoza, Thomas Hobbes. These were succeeded by others who went further and preached downright atheism. John Locke, while a sincere believer in Christianity, argued in its favour on the ground of reason, and objected to miracles being urged in support of doctrine.

The deists were answered by many writers, both Eng. and foreign; of the former William Law, Butler, and Paley were the most renowned, Paley's *Evidences* becoming a standard textbook. In Germany Lessing and others sought to 'rationalise' Bible interpretation. Kant (followed by Coleridge) tried to give this movement a new and more spiritual form. Some Ger. critics have thrown over 'natural theology' altogether in favour of revelation.

But agnosticism and the new criticism, the most recent forms of objection to 'orthodox' Christianity, are based on the modern discoveries of science and of historical research. The conflict between science and theology is no new one—Galileo was not the first to suffer in it—and though Huxley invented the *word* agnosticism in 1869, the *idea* is to be found in anct. Gk. literature, though the sophists argued on other lines and against other ideals.

The view taken by Spencer and Huxley is that concerning the deity, and also concerning many things of which we can have no *sensible* perception, we can have no actual proof or certainty. But the theologian argues that physical and spiritual knowledge are so entirely different that we cannot argue from one to the other.

The new criticism (founded on close study of the N.T., assisted by discoveries of anct. MSS., and a minute collation of those already known) began in Germany, and has extended to France, England, and America. Among well-known writings on the subject are the *Lives* of Christ by Strauss and Renan, Seeley's *Ecce Homo*, Garvie's *Ritschlian Theology*, R. Mackintosh's *Primer of Apologetics*, and Bruce's *Miraculous Element in the Gospels*.

Apologia pro Vita sua (Apology for his life), the autobiographical sketch of his position in the Oxford Movement, issued by Cardinal Newman in 1864. It contains his reasons for joining the Roman Catholic Church, and characteristically refutes Charles Kingsley's accusation that 'Truth for its own sake has never been a virtue with the Roman clergy. Father Newman informs us that it need not, and, on the whole, ought not to be' (Everyman's Library, No. 636).

Apologies of the Fathers are writings in defence of Christianity from the beginning of the second to the sixth century. They had as their objects to uphold Christianity against heathenism, to refute the false accusations made against Christians, and to show emperors the injustice of persecution. Among the Gk. apologists of the second century were Justinus Martyr, who wrote *Apologia Prima pro Christianis*, Oxford, 1700, and *Apologia Secunda*, Oxford, 1703; Athenagoras, who defended the Christians against the charges of atheism, incest, and infanticide; Tatianus; Theophilus of Antioch; and Hermas. Amongst the Latin apologists of the second century were Tertullian, the author of *Apologeticus*; Minucius Felix, who wrote the dialogue entitled *Octavius*; and Cyprian, the author of *On the Absurdity of Idolatry*. In the fifth century Origen, a Gk., and Arnobius, a Latin, wrote against the attacks of Celsus, Porphyrius, Hierocles, and Julian, who attacked the history and doctrines as well as the morals of the Christians. The greatest of these fathers was Eusebius, whose *Evangelical Preparation* contains, in fifteen books, the introduction to his *Evangelical Demonstration*, in twenty books. He explains the harmony between the O.T. and N.T., and upholds the teachings of Christ and of His disciples; and he examines the *Life of Apollonius of Tyana* by Philostratus. Other apologists were Athanasius, Chrysostomus, Cyrillus of Alexandria, and Theodoret, who argues for Christianity from the writings of the heathens. Lactantius wrote *Divinæ Institutiones* in seven books; St. Augustine *On the City of God* in twenty-two books; and St.

Jerome refutes the objection that no distinguished individuals embraced the Gospel. The work entitled *The History of Osorius* contends that plague, famine, and earthquakes were not the outcome of the Gospel.

Apologue, a fabulous story, in which a worldly-wise or moral lesson is conveyed in a lively, dramatic, and often satiric manner, the characters employed being generally of a lower order than man. *See* Jotham's so-called parable (Judges ix.), also the fables of Æsop and others, and the Ger. *Reineke*. A true 'parable' is more spiritual in its teaching than an A.

Apology (ἀπολογία), a Gk. word originally signifying a defence made in a court of justice by or for a person accused, *e.g.* Plato's *Apology of Socrates*. The word was also used for a work in defence or justification of what might be considered wrong, or be disapproved, *e.g.* Tertullian's *Apology for Christianity*, Bishop Watson's *Apology for the Bible*, and Barclay's *Apology for the Quakers*. In ordinary language it is used in the sense of asking pardon for an offence.

Apomorphine ($C_{17}H_{17}O_2N$), an artificial alkaloid, derived from morphine by the abstraction of a molecule of water. It is administered hypodermically or by the mouth to produce vomiting, and is therefore an emetic. It is also used as an expectorant, and is of great value in acute catarrhs attended with very viscid secretion, and particularly in cases of bronchitis and croup in children.

Aponeurosis (Gk. ἀπό, from, νεῦρον, [s]tring) is a medical term for a cord or [t]endon, or for a membrane made up [o]f interlacing fibres.

Aponogeton, a species of Pondweed [(N]aiadaceæ) found at the Cape, where [it] occurs in several varieties. The *A.* [di]*stachyon* is a favourite aquarium [pl]ant, having sweet-smelling white [flo]wers and bright green floating [lea]ves.

Apophthegm, or Apothegm (ἀπόφ-[θεγμ]*a*), a Gk. word signifying 'a [thi]ng spoken out.' It is a short, pithy, [and] instructive saying, intended to [con]vey an important truth to the [read]ers. Plutarch made a collection [entit]led *The Apophthegms of Kings [and] Generals*, and also of the As. of [the L]acedæmonians entitled *Laconica*. [Wh]o called them 'Salinas,' salt pits. [The f]ollowing are examples: 'Bigotry [murd]ers religion, to frighten fools [with] her ghost' (Colton's *Lacon*.). [We] ask advice, but we mean appro-[batio]n' (*Lacon*.). Bacon made a [collect]ion entitled *Apophthegms New [and Ol]d*.

[Apo]phyge (from the Gk. ἀποφεύγειν, [to flee] away), a term applied by archi-[tects g]enerally to a concave surface lying between or connecting two flat surfaces not in the same plane, and particularly to a slight concavity which is almost invariably found to terminate the shaft of an Ionic or a Corinthian column both above the base and under the necking. The more familiar English term is the 'escape,' and the Fr. term is the 'congé.'

Apophyllite, a mineral consisting chiefly of calcium silicates, and corresponding to the formula $4H_2CaSi_2O_6 + KF + 4H_2O$. It occurs generally in association with the zeolites, and large crystals have been found in India, Mexico, and the Harz Mts.

Apophysis, in physiology a protuberance or process on a bone, having no independent centre of ossification, and so forming a continuous part of the bone. Especially applied to the spinal vertebræ. In botany, a swelling of the seta below the theca or spore case in certain mosses, or on the scales on the cones of certain pines.

Apoplexy, 'a clinical term used to indicate a condition characterised by sudden paralysis, usually attended with loss of consciousness, and due either to the breaking or blocking up of a blood-vessel in the brain.' This definition, suggested by Dana, divides A. into cerebral hæmorrhage and brain softening caused by the blocking up of a blood-vessel.

The predisposing causes of cerebral hæmorrhage are alcoholism, syphilis, and gout, and the immediate cause is general physical strain or mental excitement. It occurs usually after the age of forty, although it is commonly met with at birth and during early childhood. Generally, the patient is seized without any warning, and consciousness is usually lost at once. The patient falls, the face is often congested, one side of the body is paralysed, according to the position of the hæmorrhage, and the breathing becomes stertorous. The condition may last without much alteration for a day or two, after which there are signs of inflammation in the affected area, fever and delirium may set in, and occasional spasmodic movements may be made. Death may occur at any stage, but the structural damage may be slowly repaired, though the paralysis seldom disappears altogether.

The treatment consists in placing the patient in the position where there is least constriction. The clothing should be loosened, the head somewhat elevated, and care should be taken that the paralysed tongue does not fall back into the throat. Ice bags may be placed round the head, and hot-water bottles at the feet. The bowels should be made to move freely,

calcium salts may be given to promote coagulation of the blood, and nitroglycerin to reduce the blood pressure.

Acute cerebral softening may be brought about by a blood-vessel being plugged up with material brought to the brain by the blood current, or by obstruction caused by clotting in the arteries or veins. The blood is unable to nourish properly a portion of the brain, and varying degrees of softening take place. If the condition is due to the sudden plugging of an artery, the onset is sudden and there may be loss of consciousness, or vertigo. Where clotting takes place, the onset is more gradual; there may be headaches, great depression and confusion of mind. The outlook is more promising than in hæmorrhage, death not being so likely to occur and the resultant disability being less.

Aposiopesis, in rhetoric, the abrupt ending of a sentence, which is left unfinished, for the sake of greater effect.

Apospory, like apogamy, indicates the omission of the spore stage in the life-history of a plant. The plant in this case arises vegetatively by means of budding (*e.g. Arthyrium Filix-fœmina*), and a new fern of tiny dimensions may be seen to grow from the fronds of an older one.

Apostasias are herbaceous plants belonging to the family of the Apostasiaceæ; they originally came from the mountainous forests of Java and the Penang Islands.

Apostasy, among the Gks. this word originally meant a defection from the military standard, but later and more generally a lapse from Christianity, especially if from unworthy motives. In the Rom. Church it was specially used for the renouncing of monastic or clerical vows. Julian the Apostate (331–63) attempted to displace Christianity for paganism; hence his surname.

A posteriori, see A PRIORI.

Apostle (Gk. ἀπόστολος), a messenger or envoy. A title now specially applied to teachers sent out by Jesus Christ (Luke vi. 13). But the name seems not to have been confined to the twelve, for in 1 Cor. xv. Paul says of our Lord, 'He was seen of Cephas, then of the twelve, after that he was seen of James, then of all the apostles.' Evidently while the twelve were preeminent, others also were recognised as As., and even among the twelve there was a differentiation. 'The Pillars' stood out above the rest, and 'the Lord's brethren' were specially honoured. In Acts xiv. Paul and Barnabas are both spoken of as As., though neither of them belonged to the twelve. The title thus bestowed on many leading ambassadors of Christ was claimed by some who were not entitled to it (Rev. ii. 2). During the second century A.D. a traditional restriction grew up; after this we seldom find any but the original twelve, Matthias, and Paul entitled As., their chief followers being spoken of as 'evangelists' and 'apostolic missionaries.'

Apostle Jug, a form of stoneware vessel much ... seventeenth ... both with an ... so called on account of its ornamentation with the figures of the twelve apostles in relief.

... complete set of twelve spoons is now rare and commands a high price.

Apostles, Acts of the, *see* ACTS.

Apostles' Creed, *see* CREED.

Apostles' Days, the feasts of commemoration of the twelve apostles. In the Rom... are: Matthew, S... 27; Peter and ...omas, Dec. 21; ...y 1; Simon the ... Oct. 28; ...; Andrew, Nov. ...24; James the ...5. In the Gk. ... dates are diffe... 16; John, Sept. 26; Thomas, Oct. 6; Philip and James, Oct. 9; Bartholomew, Aug. 25; Matthias, Aug. 9; James the son of Zebedee, April 30.

Apostles' I... seven is. in ... part of Wisc... about 200 ... tries are lu... ing of brow... on Madeline ... which is an Indian reservation.

Apostles, Teaching of the, often called the 'Didaché' (Gk. διδαχή, teaching), is the title of a Christian work of the apostolic age, discovered and pub. by Bryennios in 1883. It contains sixteen chapters, and is divided into two parts, the first of which gives an account of the two ways of life and death, and the second gives ... he service, the ... ninistry in the ... that this work formed the basis of the 'apostolic constitutions' dating from the third and fourth centuries. Certain passages in the 'Didaché' and in the *Epistle of Barnabas* resemble each other, and it has been a point of contention as to which preceded the other; but some think that they are independent. Harnack, Taylor, and others believe that the first part of the 'Didaché' was originally a

Jewish work entitled *The Two Ways*. The exact date of the work is not known, as the dates assigned to it vary from the latter part of the first century A.D. to the middle of the second century.

Apostolic Constitutions and Canons. The A. C., in eight books, is a collection of notes on the eccles. customs of the first five centuries. The work purports to be written by the apostles, but it is a composite work which has gradually crystallised, its composition extending over a long period of time. To the last book are appended the *Canons of the Holy Apostles*, said to have been given to the church by Clement of Rome. Opinions as to their value have varied considerably, but out of the eighty-five canons, only fifty (trans. into Lat. by Dionysius the Younger) have ever been commonly known in the West.

Apostolic Fathers. These hold an intermediate place between the apostles themselves and the apologists of a later period. The name should, strictly speaking, be given only to those believed to have been in actual touch with the original apostles, as Clement, Ignatius, and Polycarp, but by common usage it has come to include others who, during the second century, carried on the traditional teaching of the primitive church, among whom were Irenæus and Hermas. Their writings are valuable for their differences as well as their essential likeness in spirit, for they show how the growing church was influenced by both the personality and nationality of its great missionaries.

Apostolic Majesty, a title of the kings of Hungary conferred by Pope Sylvester II. upon Saint Stephen, King of Hungary, in 1000. It was renewed by Pope Clement XIII. in 1758 in favour of Queen Maria Theresa, and was used by the late Emperor of Austria.

Apostolic Succession, the doctrine that the power of ministering in the Christian and Catholic church can only be derived from a validly consecrated bishop, *i.e.* one who had himself been validly consecrated, and so on back to the time of the apostles. Or, to look at the question from the other end, that the apostles received powers of ordination which they handed on to others, and which has so been handed on down to the present bishops of the church. It is insisted on as of the *esse* of the church by the Roman Catholic, Gk. Orthodox and Anglican churches, but its necessity is denied by the various Protestant sects.

Apostolici were imitators of the apostolic life mentioned by Epiphanius (*Hæres*, 67). In the middle ages they were called Cathari. In the middle of the twelfth century there existed a sect called Apostolic Brothers on the banks of the Lower Rhine, who rejected oaths, infant baptism, fasts, ceremonies, worship of saints, purgatory, masses, second marriages, and the power of the pope. Some of them were brought before the eccles. court of the Archbishop of Cologne, and were afterwards burned to death. About 1260 Gerhard Segarelli of Parma founded another apostolic brotherhood who rejected the authority of the pope, oaths, and capital punishments.

Apostolius, Michael (*d. c.* 1480), a Gk. theologian and native of Constantinople. When the Turks conquered the city he fled to Italy, and so zealously upheld Plato's teaching as against that of Aristotle that he lost the protection of his patron Cardinal Bessarion, and retired to Crete. Among his numerous works were *Curante Heinsio* (a collection of proverbs), *Orat. panegyr, ad Fred. IV.*

Apostrophe: (1) A rhetorical figure of speech; lit. a turning away (ἀποστροφή), when a speaker breaking off his discourse addresses himself directly to some person or object. (2) A comma (') denoting elision, as in o'er. In the genitive singular it represents the A.-S. ending es, as man's for mannes. The incorrect use of the (') is a very common error.

Apothecary, originally the keeper of a drug store (Lat. *apothecarius*), later a rival of the physician. Now called in England a pharmaceutical chemist.

Apothecia (Gk. ἀποθήκη, storehouse) are open, shield-like fruits of certain fungi of the group Discomycetes, *e.g. Physcia parietina*. Here they may be seen attached to the surface of the leaf-shaped thallus, of a darker orange colour than the rest of the plant.

Apotheosis, deification, the recognising of a mortal as a god—this is very frequent in polytheistic religions. (*See* Froude's *Short Studies*, vol. iii.) Julius Cæsar was deified by Augustus, and this precedent was followed by other Cæsars. Even their relatives and favourites were often thus honoured. Constantine was deified by the pagans, and canonised by the Christians. A modified form of A. exists in the Gk. and Lat. churches, but the worship accorded to saints (*dulia*) is formally distinguished from that offered to God (*latria*).

Apotome: (1) In anct. Gk. music, the remainder of a whole tone when diminished by a limma or smaller semitone, the ratios being 2187 and 2048. (2) In mathematics, the difference between two incommensurable

numbers, or the difference between the diagonal and side of a square.

Appalachian Mts. These mts. form an important feature in the physical geography of the U.S.A., separating the plain of the Mississippi-Missouri from the Atlantic slope. Their total length, about 1500 m., extends from the St. Lawrence to Alabama, and their width in some parts reaches 300 m. They are longitudinally divided into a number of ranges and valleys, the latter forming a chain known as the Great Appalachian Valley. The chief ranges in the N. are the White Mts. and the Green Mts. (Vermont), with some smaller hills N. of the St. Lawrence; in the centre, the Blue Ridges of Pennsylvania and Virginia; in the S., the Black and the Smoky Mts. The highest of the N. peaks rise to 5000 or 6000 ft., many in the S. reach nearly 7000. On the W. the Allegheny plateau slopes to the Central Plain. The E. ranges are pierced laterally by the Hudson, Delaware, and other valleys, but the W. plateau is almost unbroken. This had a notable effect on early colonisation; Eng. settlers, with great labour and hardship, worked their way along the rivers to the Appalachian Valley, but there they were stayed for many years by the difficult country, and also by the enmity of the red men, encouraged by the Fr. from Canada and the Spaniards from Louisiana. This check helped to fill up and solidify the Atlantic states, and hardened them for their later con-ests with France and England.

The chief rivs. of the Appalachian ystem are the St. John (N. Bruns-rick), Hudson, Delaware, Susque-anna, Potomac, and James, on the .; the Alabama flowing S., and the ennessee, Cumberland, and Ken-wa into the Ohio. The ranges are rgely covered with forests, and wild imals are numerous, including the ar, lynx, and deer.

Appalachicola, *see* APALACHICOLA.

ppanage, or Apanage, in Fr. law, the provision of lands or feudal eriorities assigned by the kings of nce for the maintenance of their ger sons, and was in practice the time of the Capets until Towards the close of the thir-h century the rights of the giste were further circum-d, and in 1790 it was enacted the younger branches of the amily of France should be pro-for out of the civil list until arried or attained the age of -five, and that then a certain called 'rentes apanagéres' e granted them. In 1832 the . was substituted for that of dotation. The term A. is now give to the allowance made to the princ of a reigning house out of the publ funds. In Scotland A. is the patr mony of the prince and steward, an in England the Duchy of Cornwall i the A. of the Prince of Wales.

Apparatus Sculptoris, or the Sculptor's Workshop, a constellation distinguished by Lacaille. It is situated in the region of the heavens immediately to the eastward of the large star Fomalhaut or *a* Piscis Australis, and hardly rises above the horizon in our hemisphere. It is bounded by Cetus, Aquarius, Fornax Chemica, Piscis Australis, and Phœnix.

Apparent (in astronomy). An A. phenomenon is one which is actually seen in the opposition to that which results from correction or reduction.

Apparent Magnitude, the angle under which any line appears at the eye, that is, the angle made by lines drawn from the extremities to the eye.

Apparent Motion, the velocity and direction in which a body appears to move, when the spectator himself is in motion, without being conscious of it.

Apparition. An A. or visible spirit, or, as it is also called, a ghost. From the earliest ages amongst all peoples a belief in As. was prevalent, and it only ceases to exist with a more enlightened knowledge of the circumstances which affect the minds of men. Amongst savages there is a belief that when a man is asleep his soul leaves his body and wanders in the night, and that the adventures which happen to the soul in its wanderings are real circumstances. The soul is supposed to visit friends, relations, or enemies, and these visitations are called dreams by the person visited. There is another belief among many people that when a man dies his spirit still lives and is seen by other people as a dream of a phantasm. In the early religions the worship of the dead played a great part, for sacrifices were made to members of the family who had died. The heathen had great fear of the spirits of the dead, which were regarded by him as demons. Against these demons he believed he had to struggle, and in order to succeed he embraced witchcraft. Closely allied to this belief in As. is the belief in ghosts, who were supposed to be evil spirits who haunted houses. The spirit of a murdered man is supposed to visit the murderer in the night. Ghosts have been alleged to appear in the same dress they wore when living; they are often pale and cloudy in appearance, and the ghosts seen in churchyards are often clothed in white. This belief in As. has had a very powerful

influence on the mind of mankind. It has caused suffering and pain, and has often been the cause of the loss of the reasoning faculties; it preoccupied the mind; and the priest and the tyrant were powerful to delude the weak. There is no doubt that these delusions and superstitions were the outcome of ignorance, as may be proved by the investigations as to the causes of these physical and mental phenomena. It is well known that there are physical conditions which are necessary to sound thought, and a mind which is deranged by fear, by disease, or even by excitement, has a tendency to form images of those objects which have caused the derangement. Fear of a certain object has often caused that object to appear to the mind. As. have in all ages formed the subjects of pictures and of writings. Short ghost stories have been written from time immemorial. Amongst the works written on As. may be mentioned Samuel Hibbert's *Sketches of the Philosophy of Apparitions, or an Attempt to trace such Illusions to their Physical Causes*, 1824; Baxter's *Certainty of the World of Spirits*, 1691; Crosland's *Apparitions*, 1850; J. Beaumont's *Treatise of Spirits*, 1705; A. Calmet's *Phantom World*, 1850; Crowe's *Night Side of Nature*, 1852; Ferrar's *Essay towards a Theory of Apparitions*, 1813; Ingram's *Haunted Homes*, 1884; Savile's *Apparitions*, 1874; Lilly's *Ghost Stories*, 1904; A. Lang's *Book of Dreams and Ghosts*, 1897, and *The Ghost of Cock Lane*, 1894; W. T. Stead's *Real Ghost Stories*, 1897; and the Psychical Research Society's publications.

Apparitor, in Rom. times, was a person who was in attendance on public functionaries to execute their orders (Livy, iii. 58). The term therefore included a great variety of officers (Justinian Code, 12, tit. 52, etc.). In later times an A. was a messenger in eccles. courts, whose duty it was to call defendants into court, and to execute the orders of the judge.

Appeal. In law, to remove a cause from an inferior to a superior court for the purpose of re-examination or for decision. In it the party appealing, called the appellant, tries to show that the decision of the lower court on a matter of fact or of law was erroneous, that the verdict was against the weight of evidence or the sentence excessive. By this means judicial abuses are reduced to a minimum and something approaching uniformity in judgment is secured by the fact that the judges or magistrates in the lower courts have the precedents and dicta of the higher courts to guide them. The party appealed against is called the respondent or appellee. The idea underlying the system of A. would appear to be that a principal does not divest himself of responsibility when delegating his authority to an agent. Judges being but the agents of the king, and through the king of the community, the responsibility for their decisions should, in grave cases at any rate, be brought home to its source. It is this idea which enabled St. Paul, brought before Festus, to say, 'I appeal to Cæsar' (Acts xxv.), and to have his A. allowed, and it is this idea which gives to every British citizen the right of appealing in the last resource to the 'King in Parliament,' in other words, to the *House of Lords*. As. can be made from Indian and colonial courts to the 'King in Council,' *i.e.*, the Privy Council functioning through its judicial committee. In theory the entire House of Lords, or entire Privy Council, hears the A. In practice the House of Lords in its *legal capacity* consists of certain Law Lords whose functions are regulated by the Appellate Jurisdiction Acts, 1876 and 1887. The Law Lords consist of the lord chancellor, four lords of appeal in ordinary, and other peers of parliament who hold or have held important judicial office, three forming a quorum. No peer is excluded, but by custom peers other than those mentioned neither attend nor vote. In the case of Bradlaugh *v.* Clarke, in 1882, an eccentric and non-legal peer successfully asserted his right to sit and did so, voting with the minority. As. lie from the courts of A. in England, and from the Court of Session in Scotland, but there is no A. from the Scotch High Court of Justiciary. As. from the Eng. courts must be brought within twelve months. As. from the Court of Session must be brought within two years. Each of the lords may make a speech in the form of a judgment giving his views, and the decision is by majority. If their lordships should be equally divided in opinion the decision of the Lower Court stands and each side must pay its own costs. The Law Lords may sit independent of the fact that parliament is prorogued or dissolved. The Privy Council's jurisdiction as an appellate court has been subjected to many modifying statutes, the Act which constituted its judicial committee being passed in 1833. This committee consists of the president of the council and the lord keeper and other councillors who hold or have held high judicial rank in the colonies or at home. Together privy councillors may be added by

the king and assessors in the persons of colonial judges, and in eccles. cases, of which the Privy Council is the final arbiter, bishops are sometimes added. The Court of A. in England as constituted by the Judicature Acts, 1873–5, consists of the lord chancellor, ex-lord chancellor, lord chief justice, the master of the rolls, president of the Probate Division, and five lord justices. The quorum is three, unless both parties agree to have the case tried by two, and no judge may hear in the A. Court an A. against his decision in the lower court. The Court of A. is usually divided, and sits in two courts, one being presided over by the master of the rolls and the other by the lord chief justice. As. are heard from both div. of the High Court, from the Palatine Courts of Lancaster and Durham, the Liverpool Court of Passage, bankruptcy, etc., and the question of registration and parl. election petitions under the Corrupt Practices Act. The A. court may, but in practice seldom does, hear fresh evidence on A., and it may reverse the findings of the lower court, but as a rule it contents itself with ordering a new trial. Until the Criminal A. Act, 1907, the practice of the criminal law in this country was almost unique in the fact that no A. was allowed from the assizes (other than on a question of law reserved by the trial judge for the opinion of the old Court for Crown Cases Reserved (*q.v.*)), though clemency might be exercised by the sovereign on the advice of the home secretary. While, of course, the royal prerogative of mercy remains, the Court of Criminal A. (England), with carefully defined and somewhat estricted jurisdiction, offers to the onvicted criminal another chance. he court consists of the lord chief stice and eight judges of the King's ench Division appointed by him in onsultation with the lord chancellor. hey do not, of course, all sit at the me time, but there must be not s than three and always an unen number of judges. An A. lies the court on any ground which olves a question of law alone, but s only by leave of the court or n the certificate of the trial judge , an A. lies on any ground ining a question of fact alone, or ed law and fact. There is also ht of A., by leave of the court, nst sentence. In a few specified there is a further A. to the e of Lords. What are known visional courts, that is, courts ting of two high court judges, nearly all the As. from quarter ns and county courts, but the nt of the inferior court must in some cases first be obtaine Similarly, the consent of the divisiona court is necessary before an A. fro it to the A. court. The quarter ses sions hear As. from courts of summary jurisdiction (police courts) when fines have been imposed 'without the option.' In the Scotch courts there is an A. from the Outer to the Inner House of the Court of Session: from the sheriff court to the Court of Session, when more than £50 is involved; from the sheriff-substitute to the sheriff-principal; to the High Court of Justiciary, on points of law; from inferior courts in criminal cases; and to the quarter sessions from the petty sessions. For A. in the old criminal law of England involving trial by combat, *see* article under that head.

Appearance. In law, within eight days from the service of a writ or summons, the defendant must 'enter an A.' by delivering to the proper officer of the court a memorandum stating his intention either to defend the case himself or to employ a solicitor on his behalf. Notice of this is given to the plaintiff. This procedure obviates the need of a personal appearance. In civil cases special provision is made for the representation of infants, lunatics, companies, etc., by responsible persons.

Appellants, or Lords Appellant, the title given to Thomas, Duke of Gloucester, and the Earls of Derby, Arundel, Nottingham, and Warwick, who in 1387–8 'appealed,' *i.e.* accused of treason, De Vere and De la Pole, the advisers of Richard II. during his minority. The L. A. were responsible for the actions of the 'Merciless Parliament' of 1388. In 1397 Richard imprisoned Warwick and Gloucester, and caused Arundel to be executed.

Appendant, a legal term applied to incorporeal hereditaments. Thus advowsons may be A. to a manor; lands to an office; and various rights, as of fishing, to a freehold. As., as being originally annexed to the prin., are distinguished from appurtenances, which may be created by grant or prescription at any time.

Appendicitis, *see* Appendix.

Appendicularæ (Lat. *appendix*, from *appendere*, to hang from), family of Ascidians belonging to the Phylum Tunicata, including sev. genera, notably the A., Oikopleura, Fritillaria, and Kowalevskia. They have an oar-shaped tail which contains a persistent notochord, and they have two gill-apertures. Huxley destroyed the fallacy that they were larvæ.

Appendini, Francesco Maria (1768–1837), was *b.* near Turin. After studying at Rome, he went to Ragusa to fill the chair of rhetoric,

and was the author of a *History of Ragusa*, and of several treatises and a grammar of the Illyric language, that is to say, of the Dalmatian dialect of the Slavonian. Even after Ragusa was taken by Napoleon, A. remained as rector of the College of Ragusa; but when it became Austrian in 1814 A. was commissioned to establish a school for teachers at Zara, where he *d*. He did much to further education.

Appendix, in anatomy, an appendage; the term is applied particularly to the A. vermiformis, the small blind gut projecting from the caecum. The average length of the A. is 4½ in., and the diameter about a quarter of an inch. The size, however, varies greatly, and cases have been recorded of the congenital absence of the A. It has no known function in the human body, and probably represents an organ which is gradually being evolved out of existence. Hence its vitality is low, and it is peculiarly susceptible to the inflammation known as appendicitis.



The appendix (*g*) attached to the caecum (*c*) which is opened to show the small intestine entering at *e, f*; *b*, large intestine.

Appendicitis is favoured by any structural defects of the organ, such as unnatural length, location, and arrangement. The presence of fæcal concretions and foreign bodies, such as seeds, gall-stones, bristles, worms, etc., acts as a predisposing cause; and intestinal disturbances, caused by indiscretions in the diet, may bring about an attack. Females are less often attacked than men, because there is often a lymphatic connection between the A. and the right ovary, so that it is not so completely shut off. The onset may be gradual, but frequently is quite sudden. There are abdominal pain, fever, and constant tenderness on pressure over a limited area midway in a line between the anterior superior iliac spine and the umbilicus.

Surgical treatment is of great importance. Although all cases do not demand operation, a surgeon should always be at hand to help to settle the important question of when celiotomy should be performed. At the beginning of an attack is the safest time, but if abscesses are being formed before the condition is recognised, it is wiser to wait until adhesions have been formed. The death-rate from appendicitis has of late been enormously reduced by prompt surgical interference. The period of convalescence demands great care in the management of diet and bowel-action, and no exercise of any kind should be undertaken for some time.

Appenzell, a canton of N.E. Switzerland, enclosed within the canton of St. Gall. It is divided into Ausser Rhoden, mainly Protestant and industrial, and Inner Rhoden, Rom. Catholic and pastoral. A remarkable feature of A. is the yearly *Landesgemeinde*, or general assembly, held in each Rhoden, at which every adult male citizen *must* appear, girt with a sword. Here the local gov. and the representatives to the Swiss federal assembly are elected. From the eleventh to the fourteenth centuries A. was under the abbots of St. Gall, but after a hard struggle for independence it became a member of the Swiss confederation in 1452. Its old code of laws (the Silver Book) is still used in swearing-in the executive at the *Landesgemeinde* in Inner Rhoden. Ausser Rhoden (pop. 55,000, chief tn. Herisau) manufs. cotton, muslin, and embroidery. Inner Rhoden (pop. 14,500, cap. A. pop. 2771) is especially conservative in the retention of old-world dress and traditions.

Apperception, a metaphysical term first introduced by Leibnitz (1646–1716), to denote the spontaneous transformation by the mind of the 'perceptions' of sense into the elements of conscious knowledge. This idea was taken up by Kant (1724–1804), who laid special stress upon the spontaneity of the mental action involved, and introduced the theory of the 'synthetic unity of A.,' *i.e.* the principle that all incomplete know-

ledge must be capable of falling into place in one complete system. The psychological side of A. has been worked out by Herbart (1776–1841), Lazarus (1824–1903), and Steinthal (1823–99), who emphasise the practical significance of the process, and make the realisation of this the basis of educational theory. The subject has received still further attention from Wundt and Stout. *See* Leibnitz's *New Essays*, Herbart's *Psychology*, Stout's *Analytic Psychology*, Wundt's *Grundzüge der physiologischen Psychologie*, etc.

Apperley, Charles James, better known as 'Nimrod,' under which pseudonym he wrote many articles for the *Sporting Magazine* and the *Quarterly Review*, besides sev. books on sporting matters, including the famous *Life of John Mytton*. He was an enthusiastic fox-hunter, and his books take high rank in the literature of sport. He *d.* in London, 1843.

Appert, Benjamin Nicolas Marie (1797–1847), Fr. philanthropist. When young he interested himself greatly in the education of soldiers, and wrote a manual on the subject. In 1822, being accused of having assisted some political prisoners to escape, he was imprisoned in La Force. His experience there showed him the need for prison reforms, and thenceforward he gave himself almost entirely to philanthropical work. His *Journal des Prisons* records observations made during travels throughout Europe.

Appiani, Andrea, the Elder (1754–1817), a famous fresco-painter of Milan. He modelled himself on Correggio, and is thought in his frescoes 'Amor and Psyche' at Monza, and others in the royal palace at Milan, to have almost equalled his master. His prosperity ended with that of his great patron, Napoleon I.

Appiani, Francesco (1702–92), a distinguished fresco-painter of the eighteenth century, was *b.* at Ancona. He was employed by Benedict XIII. in Rome, but he lived chiefly at Perugia, where he continued to paint until his death. He shows a degree of colour, except in the cases of Spinello, Aretino and Titian, perhaps without parallel. He painted, according to Lanzi, many pictures for English commissions.

Appiano was the name of an It. family in the middle ages. Jacopo A. was secretary to Pietro Gambacorta, who made him chancellor of Pisa. He killed Gambacorta and his sons 1392, and acquired Pisa, which was retained until his son sold it to the Duke Visconti of Milan about ... Piombino, however, was retained by the family until 1589, when Alessandro, the last possessor, was killed, and it fell into the hands of Spain. Finally, it was given by Bonaparte to his brother-in-law Felix Baciocchi.

Appianus (*c.* 90–140 A.D.), an important Rom. historian, *b.* in the first century A.D. A native of Alexandria, he there attained high office, but about 100 A.D. removed to Rome. Here he practised as a lawyer, and also occupied himself in composing a series of chronicles of the growth of the Roman empire, taking the chief dists. and periods separately. His twenty-four vols., eleven of which are extant, were merely compilations, and are not made attractive by eloquence or any great power of thought. Yet writing as he does on the history of those periods, especially of the civil wars, of which there are few memorials remaining, his records are of great value. His works have been ed. by sev. modern authorities, notably in German by Schweighäuser, Bekker, and Mendelssohn, and an Eng. translation is pub. in Bohn's Classical Library.

Appia Via, a Rom. military road, begun about 312 B.C. by Appius Claudius, to consolidate the conquest of Samnian territory. Appius illegally prolonged his censorship that he might complete this work, and his famous aqueduct. He carried the former from Rome to Capua, and the skill with which it is taken through difficult country, over hills, ravines, and marshes, is remarkable. It was continued later to Beneventum and Brundusium, and so solidly was it constructed that much of the old work remains to this day. Statius calls it *longarum regina viarum*. For miles out of Rome it is bordered with pagan and early Christian ruins. Horace, in his first satire, describes a journey along it, and St. Paul came this way into Rome (Acts xxviii. 15). Trajan varied its final stage by a new route, the Via Traiana, from Beneventum by Canusium, and Pius VI. in 1789 constructed the New Appian Way from Rome to Albano.

Appin, a dist. of Argyllshire, in 'the Stewart country,' between Loch Linnhe and Loch Creran, with rugged but beautiful scenery. Slate, granite, and lead are worked. Principal vils., Ballachulish, Duror, and A. This dist. plays an important part in Stevenson's *Kidnapped*.

Appius Claudius, *see* CLAUDIUS.

Apple, a spurious fruit, or pseudocarp, of the species *Pyrus malus* of the Rosaceæ. It has been cultivated for many ages and in many lands; Homer speaks of its presence in the gardens of Alcinous and Laertes, while, according to the phrase of

Horace, a Rom. banquet lasted *ab ovo usque ad mala*, from the egg to the A. It is a spurious fruit because the calyx-tube swells up to form the fleshy part. The *pips* are the seeds, and the pseudocarp is called a *pome*.

Apple, Love, is a name of the tomato, which is a berry, the fruit of *Lycopersicum esculentum*, a species of Solanaceæ.

Apple of Sodom, or Dead Sea Apple, the fruit of a tree said to grow on the shores of the Dead Sea. The legend avers that it looks like a tempting fruit, but when plucked is found full of ashes. Thus 'like an apple of Sodom' has come to signify disillusion.

Appleby, a bor. and mrkt. tn., cap. of Westmorland, on the R. Eden. It was an important stronghold in the Norman period, and suffered so much from attacks by the Scots in 1176 and 1388 that it never regained its former status. During the great rebellion it was held for the king by Anne, Countess of Pembroke. It returned two members to parliament until 1832, when it was disfranchised. Pop. 1785.

Appleton, co. seat of Outagamie co., Wisconsin, U.S.A., on the Fox riv., about 90 m. N. of Milwaukee. First settled in 1833. Has a famous univ., founded by Amos Laurence in 1847, also large manufs. of paper, machinery, woollen goods, etc. It became a city in 1857. Pop. 25,262.

Appleton, Charles Edward, Eng. journalist. In 1869 he founded the *Academy* (*q.v.*), which he ed. until his death in 1879.

Appleton, Daniel (1785–1849), an American publisher, *b.* at Haverhill, Massachusetts; when about forty years of age he removed to New York. His firm, D. Appleton & Co., was one of the first to specialise in the importation of English books.

Appleton, Nathan (1779–1861), an American merchant and politician, *b.* in Hampshire; he co-operated with F. C. Lowell in introducing the power loom in the U.S.A. He established a cotton factory at Waltham, Massachusetts, and Lowell, Massachusetts. He sat in the National House of Representatives and advocated protective duties.

Appleton, Thomas Gold (1812–84), American author, *b.* in Boston, Massachusetts; son of above Nathan A.; graduated at Harvard. His works include *A Nile Journal*, 1876; *Syrian Sunshine*, 1877; *Windfalls*, 1878; and *Faded Leaves*—his collected poems. The originator of the saying, 'Good Americans, when they die, go to Paris.' *See* his *Life and Letters*, by Susan Hale, 1885.

Appoggiatura (It. *appoggiare*, to lean on), a short musical note used as an embellishment, and having no time-value. The time of the long A. is taken from the note which follows it; it is given its marked value, and the succeeding note takes what remains of its face value. It originated in the desire of classical composers, such as Beethoven, to hide a suspended note, and is now obsolete. The short A. is known also as an acciaccatura (*q.v.*) or grace-note, and is written with an oblique stroke through the stem.

Appointment, *see* POWER.

Appomattox Courthouse, a vil. in Appomattox co., Virginia, where the Confederate army under Lee surrendered to the Federals under Grant on Sunday, April 9, 1865, and ended the civil war.

Apponyi, Count Albert (*b.* 1848), Hungarian statesman and the 'Grand Old Man of Hungary.' Originally leader of the 'Nationalist Party' (Conservative), but in 1899 went over to Liberals. Leader of the Independent Kossuth Party, which opposed the Hapsburg Dynasty. In 1901 became president of the chamber of deputies, but resigned from the Liberals in 1903 and again led the 'National Party.' In 1906 as minister of education his work had a profound effect on Hungarian culture. After the Communist revolution he was commissioned by the Entente to form a government in Hungary, but failed to secure agreement between the different parties. Was chairman of the Hungarian peace delegation. Won the Grotius prize of The Hague University together with Earl Balfour.

Apportionment, signifies generally a sharing in due proportion, as in the allocation of benefits, damages, liabilities, etc. In law the regulations concerning A. are so numerous and complicated that special Acts to systematise them have repeatedly been passed in Great Britain, the Colonies, and the U.S.A. They fall under two main heads: (1) A. in respect to estate; (2) A. in respect to time. Property bequeathed on trust under certain conditions is governed by what is called *equitable* A.

A. Bills are passed in the U.S.A., one after every census, to determine the ratio of representation for each state in the coming decade; the states themselves also make similar regulations for their own legislatures. This system has often been greatly abused for party purposes.

Apposition. In grammar, when a noun or noun-clause is used to explain a noun or pronoun in the same case, they are said to be in A.; thus 'John the Baptist was beheaded,' 'He,

the chief culprit, escaped.' Here 'the Baptist' and 'the chief culprit' are nominatives in A. to 'John' and 'he' respectively. Again, 'Alexander killed Clitus, his friend;' here 'friend' is objective in A. to 'Clitus.' In the possessive case the apostrophe is added to the second noun, as 'William the Conqueror's army.'

Appraisement, a legal term meaning valuation, such as may be required for purposes of sale, distress, mortgage, assessment, compensation, or probate. Any person undertaking the work, unless he is a licensed auctioneer or house agent, must take out an appraiser's licence, the penalty for default being £50. He is liable to the person employing him for any loss arising through negligence or want of skill on his part.

Apprentice, one who is contracted to a master for a certain period to be taught a trade or profession; in return he gives his services, and usually a premium is paid. The system can be traced back to the thirteenth century, when it applied to *all* trades and professions, even students being indentured to study for their degrees. Barristers were technically 'As.' for sixteen years, but for most arts and crafts the term was seven years, which period was made universal and compulsory early in the reign of Elizabeth. Difficulties and anomalies arising later led many persons to question the value of this arrangement, and after much argument, in which Adam Smith in his *Wealth of Nations* took a leading part, parliament decreed in 1814 that trades and handicrafts should be thrown open to non-As. also. Of late years, owing to many causes, such as parents' difficulties in paying premiums, the increased subdivision of labour, trade union restrictions, etc., the number of apprenticeships has so decreased as seriously to affect the supply of thoroughly trained workmen. Efforts have been made by various public bodies to remedy this, with only partial success.

An A. being generally a minor, the contract is signed on his behalf by a parent or guardian. It must always be stamped, except in the cases of parish and ships' As. A master has considerable authority over a lad during his period of service, but the tyranny and ill-treatment which were common in olden times are now unknown. The A. must work on any day his master requires, except Sunday, and must not enter upon any engagement which might interfere with his duties, without the employer's consent. Obedience and good conduct are imperative, but corporal punishment for misbehaviour has become obsolete. The master must supply proper training, and indoor As. must be provided with food and medical attendance. He cannot discharge an A. without grave cause, such as serious misconduct or permanent disablement. The agreement is at an end if the master dies or becomes bankrupt, and it may be concluded by mutual consent.

Approaches, in warfare, trenches dug by besiegers to protect them in gradually working their way nearer to the line of fortification. Introduced into Europe by the Turks in the fifteenth century.

Approbate and reprobate, a Scottish theological term corresponding to the Eng. 'doctrine of election.'

Appropriation (from Lat. *appropriare*) means the setting aside of money or other property to be applied exclusively for one particular use. In Eng. eccles. law, the existing system of impropriation is the result of the changes made during the reign of Henry VIII., when at the dissolution of the monasteries many of the lands which had belonged to the Church were granted by the king to his courtiers and others. These estates often included rich benefices, whose principal tithes had been appropriated to the use of a monastery or bishopric, while a vicar or curate had been appointed to take charge of the parish duties. The new owners continued the custom, and those of them who were laymen came to be called lay impropriators, or lay rectors.

In civil law, a debtor who owes separate amounts to the same creditor is entitled when making a payment on account to allocate the money as he likes in respect of the different debts. If he pays it in without making any such stipulation the creditor can appropriate it as he chooses, even to the payment of a debt which has been allowed to lapse. If there has been no selection by either the law generally gives the preference to earlier rather than later debts.

In constitutional finance, both in Parliament and in the U.S.A. Congress, special Appropriation Acts are passed every session to authorise payments by the treasury of various sums required for the public service, as set forth in estimates presented to and passed by the House.

Appropriation Clauses, these clauses relating to changes in connection with the revenues of the Irish Church, particularly with regard to the diversion of a considerable sum for educational purposes, were passed in 1838, after several years of keen dispute.

Approved Society, *see* NATIONAL INSURANCE.

Approver. By the old Eng. law,

when a person who had been arrested, imprisoned, and indicted for treason or felony confessed the crime charged in the indictment, and was admitted by the court to reveal on oath the accomplices of his guilt, he was called an A.

Approximation, a term used in mathematics to denote a result which is not exact, but sufficiently accurate for the purpose for which it is required. Where calculations depend on measures of length, weight, etc., the measurements themselves, even with the best of instruments, are only approximate, so that it is useless to elaborate the calculations to a degree of refinement exceeding the efficiency of the instruments. Where money calculations are involved, it is usually unnecessary to carry them further than the limits of the coinage: for instance, interest calculations do not generally include fractions of a penny. A. may be procured by limiting the number of places of decimals, or the number of significant figures, or by expressing the result as correct within a certain fraction of error of the whole. In pure mathematics, logarithms and trigonometrical constants are usually only correct to a certain number of places of decimals.

Apraxin, Feodor (1671–1728), a distinguished Russian soldier and admiral under Peter the Great, whom he greatly assisted in founding the Russian navy. He took a leading part in the wars against Sweden and Turkey, and was made senator and admiral-general. Brave, genial, capable, and energetic, he was yet greedy and dishonest, and incurred Peter's wrath to such an extent that he would have been beheaded but for the intervention of the Empress Catherine, whom later he helped to place on the throne at Peter's death.

Apraxin, Stephan Feodorovich (1702–58), nephew of the above, was also a great soldier, distinguishing himself against both Turkey and Prussia.

Apricena, a tn. of Apulia, Italy, 21 m. N.W. of Foggia. Pop. [illegible].

Apricot, a well-known fruit, a drupe, of the *Prunus Armeniaca*, a species of Rosaceæ. It is related to the cherry, almond, peach, and plum, and is largely cultivated in Europe.

Apries, an Egyptian king, who was the son of Psammis, and the [illegible] of the twenty-sixth dynasty ([illegible] according to [illegible]), or the seventh according to Africanus. In Hebrew history he is known as Pharaoh Hophra (Jeremiah xliv. 30). He succeeded his father in [illegible] B.C. and reigned [illegible] years. He made an expedition against Cyprus, and fought a naval battle with the King of Tyre. His army sent against the Gks. of Cyrene was defeated, and this circumstance caused a revolt of the people under Amasis, whom they asked to be king. A. was defeated and executed 569 B.C., and was buried at the temple of Athenæ at Sais. *See* Herodotus, ii. 161–163 and 169; iv. 159.

April, the fourth month of the year, consists of thirty days, which was the number said to be assigned to it by Romulus. Numa Pompilius gave it twenty-nine; but Julius Cæsar gave it thirty, which number it has since retained. In the original Alban or Lat. calendar A. consisted of thirty-six days and was the first month. The Rom. name was 'Aprilis,' from *aperire*, to open; either from the opening of the buds, or of the bosom of the earth in producing vegetation. The A.-S. name was 'Oster,' or 'Easter-Monath.'

A priori and A posteriori. The contrast between these two methods of reasoning does not now imply exactly what it did in anct. times. By an *a priori* argument was originally meant one from law or cause to effect, by *a posteriori* one from effect to cause. Kant, the great Ger. philosopher, introduced a new distinction. Reasoning on the fundamental laws of the mind, he asserts that there are certain 'transcendental ideas' (called by him *categories*), which exist independently of experience, and arguments from these are *a priori*. Such ideas are those of space, time, reality, causation, and others, which he says we do not derive from experience, but through the application of which we acquire experience. In morality also he declares that the ideas implied in the words good and bad are innate and imperative in every mind, independently of actual observation. *A posteriori* arguments, on the other hand, are derived from experience founded on observation. That school of philosophy which sets the highest value on the Kantian *a priori* reasoning is called Intuitionalist or Transcendental; the opposing school are called Empiricists.

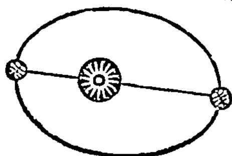
Apron, the original meaning of a protective [illegible] garment has been [illegible]

Apsaras, in Hindu mythology, a [illegible]

Apse, a semicircular or polygonal termination to or prolongation of a church or other building, more common on the Continent than in England. Beside the A. at the eastern (or western) end, others have sometimes been added, for example, at the ends of transepts. As. are frequent in Byzantine and Coptic churches, and in anct. Rom. buildings.

Apsheron is a peninsula in the Caspian Sea at the end of the Caucasus Mts. The seaport of Baku is situated here, and the dist. has a very large petroleum industry. It is under the government of Russia.

Apsides. All heavenly bodies, except free-wandering comets, move round their primaries in an elliptical orbit, and the two points in that orbit which are at the greatest and least distance from the central body are known as As. The point most distant is called the higher apsis or aphelion, that least distant the lower apsis or perihelion, terms when used in connection with the moon are called apogee and perigee. The 'line of As.,' is the major axis of the ellipse.



APSIDES

This line, which, owing to the attraction of other bodies, is always shifting forward (in the case of the earth and all the planets except Venus, where the motion is retrograde), gives rise to what is known as the anomalistic year, *i.e.* it takes the earth 4 mins. 39 secs. longer than the sidereal year to return to its perihelion.

Apsley House, a mansion standing [by] Hyde Park, London. It was built [b]y Baron Apsley, Lord Bathurst, in [1]785, and in 1820 was purchased by [th]e gov. and presented to the Duke of [W]ellington, who lived there till 1852.

Apt (of old Apta Julia), a Fr. tn. in [th]e dept. of Vaucluse, 30 m. S. of [Av]ignon. The cathedral was built [ab]out the tenth century. Pop. 6000.

Apteral (Gk. α privative, and πτερόν, [win]g), an architectural term applied [to] a temple which has prostyles, whose columns do not extend [late]rally and run along the flanks [fro]m one end to the other. Few Gk. [tem]ples followed this fashion but [mos]t of the Rom. parallelogrammic [tem]ples were apteral prostyles.

[Ap]tergota, or **Aptera**, are insects which are themselves wingless, a[nd] are thought to have descended fr[om] wingless ancestors. They thus dif[fer] from such insects as wingless ant[s] which have winged relations an[d] ancestors. In this group there ar[e] only two orders, the Collembola an[d] Thysanura. The best-known specie[s] in Britain belongs to the latter order and is the *Lepisma saccharina*, the silver-fish, found in kitchens.

Apteryx (Gk. α privative, and πτέρυξ, wing), or **Kiwi**, a bird found only in New Zealand, is a ratite bird of the family Apterygidæ. The tail and wings are minute and useless, the feathers are hair-like, the beak is long and weak. It is about the size of a hen, is nocturnal, insectivorous, and lays a single large-sized egg.

Aptornis, an extinct bird of the family Rallidæ, to which the water-hens and coots belong. It was incapable of flight, and was a native of New Zealand.

Aptychus (Von Meyer), one of the generic names of a singular fossil, supposed to be the remains of a conchiferous mollusc, or the opercular shell of a cephalopod.

Apuan Alps, a branch of the Etruscan Apennines, 30 m. long, lying parallel to the Ligurian Alps and falling very steeply to the Mediterranean. The greatest alt. is reached in Mt. Pisanino (6382 ft.). They are noted for beautiful white marbles (Carrara, Massa, etc.).

Apuleius, Lucius (*b.* A.D. 130), a Rom. satirist and rhetorician, *b.* at Madaura, N. Africa, was the son of a wealthy magistrate. He studied at Carthage and Athens, and showed a preference for the philosophy of Plato. After the death of his father he used the great riches left him to travel, and went to Italy and Asia. The outcome of this was his great satire *The Golden Ass*, a clever and powerful work, in which he shows up the hypocrisy and debauchery of certain orders of priesthood. The finest part of this work is the episode of Cupid and Psyche, which is pub. separately (W. Adlington's trans., Dent, 1903). *The Golden Ass* was first trans. into Eng. by Sir G. Head in 1851 in Bohn's Classical Library. A. married a wealthy widow, and was accused by some of having gained her by witchcraft. His defence was pub. and is a very fine piece of work (*Apologia sive oratio de magia*). He spent the latter part of his life at Carthage, and the exact date of his death is uncertain.

Apulia, a div. of Italy now known as Puglia, comprising the three provs. of Bari, Toggia, and Lecce, with an area of 8540 sq. m. The Apulian Plain forms the N. part, which is

rather barren, although sheep are bred there and cultivation of the land is practised in certain spots. The S. part is more hilly, and in the N.W. of this part is the isolated mt. of Gargand, which reaches to the height of 5000 ft. in one place. The R. Ofanto (Aufidus) is the chief waterway of the dist., and there are four fairly large lakes. The chief exports of the place are wine, fruit, cereals, and silk. The prin. ports are Gallipoli, Taranto, and Brindisi, while the chief tns. are Barletta, Andria, Lecce, and Bari. In anct. times A. was inhabited by sev. peoples, as the Apuli, the Messapii, and the Daunii. It was conquered by the Roms. in 317 B.C. The Second Punic War was partly fought here, and the battle of Cannæ took place within its borders in 216 B.C. It came under the power of the E. empire, and afterwards became part of the Lombard duchy of Benevento. The Byzantines recovered part of it subsequently, only to lose it again to the Normans, and afterwards Robert II. seized it and merged it under the crown of the Two Sicilies.

Apure, a riv. in Venezuela which rises in the Cordillera Mts. and flows into the Orinoco. The chief tns. on its banks are San Fernando and Nutrias. Its course is about 1000 m., and it is navigable for just over half that distance.

Apurimac, a riv. in Peru which rises in the Andes in the prov. of Arequipa. After a course of about 600 m. it joins the R. Ucayali, and finally the Amazon. It also lends its name to the dept., which has an area of nearly 8200 sq. m. The cap. is Abancay, and it yields rubber, rice, and cotton, having also excellent grazing land for cattle-breeding.

Apus (Gk. α privative, and πούς, a foot), a constellation introduced by Bayer, which lies too near the S. Pole to be visible in our hemisphere. It was sometimes called the *Avis Indica*, or Bird of Paradise, which was formerly believed to have no feet.

Aqua fortis, an old name for nitric acid.

Aquamarine (Lat. *aqua*, water, *marinus*, pertaining to the sea), a sea-green or bluish-green variety of beryl which is used as a precious stone. It is found in N. and S. America and in Australia.

Aqua regia, a mixture of nitric acid with four times its volume of hydrochloric acid. It derives its name from its capacity for dissolving the so-called 'noble' metals, such as gold and platinum, which are unaffected by most solvents.

Aquarium (Lat. *aqua*, water), a small reservoir of fresh or salt water in which aquatic animals and plants are kept for scientific purposes, or for amusement. Large aquaria are to be found in all places, such as zoological or botanical gardens and laboratories in which biology is studied.

Owing to the placidity of the water and air, an A. is difficult of æration: artificial fountains, the presence of green plants, and the action of pouring water from a height are all beneficial. In a salt-water A. the green alga of the genus *Ulva* grows readily, while duckweed will flourish in fresh water. The amateur natural historian will find sticklebacks, minnows, newts, tadpoles, axolotls, and water-snails to thrive under his care, but fish are difficult to preserve alive. Gold-fish, sun-fish, thunder-fish, and cat-fish frequently are denizens of aquaria, but they are liable to be attacked by a fungus disease which usually proves fatal. Insufficient aeration and decaying food will cause a white, film-like substance to cover their bodies, hamper their movements, infect their neighbours, and work speedy havoc among them. It may sometimes be removed by placing them in water in which salt has been dissolved, or by gentle application of a soft paint-brush when the patient is under running water. The *Triton cristatus*, a large newt, is a hardy, carnivorous amphibian which requires a large receptacle, and at certain periods of the year prefers to live on land.

Aquarius, a group of stars forming the eleventh sign of the zodiac. This constellation is supposed to bear a resemblance to a water-bearer, hence its name, and its hieroglyph ♒. The sun enters this constellation on Jan. 21. The origin of the name has been traced by some of the fact that the Nile rises during the month of A., whilst others attribute it to the rainy season in India. No star in A. is brighter than the fourth magnitude, but it includes some interesting double stars, a fine star-cluster, and the 'Saturn' nebula.

Aquatic Animals is a vague and wide term applied to animals which cannot exist without water, to amphibians which take to it on occasion, and to animals which are [illegible] at home on land; it includes [illegible] which respire air by means of [illegible] or water by means of gills, [illegible] cilia, or any other apparatus [illegible] are distributed over the world.

Most of the lower inver[illegible] truly aquatic; sea-anem[illegible] and many of the annelid[illegible] worms, and crustacea[illegible] and lobsters, cuttle[illegible] such as mussels and [illegible]

exception of some gasteropods, would perish if exposed to the sun and deprived of water. Among vertebrates fish are exclusively formed for inhabiting a fluid medium; they breathe by gills, are covered with scales, their form is elongated and compressed, the eye is suited to the dense medium of the water, they balance themselves on fins, and the lateral tail serves as a paddle. Among reptiles, crocodiles and turtles may be regarded as truly aquatic; they breathe air, however, and come on land to lay their eggs. Nearly all aquatic birds (except, *e.g.*, the water-ouzel) have webbed, oared, or lobated feet, as grebes, auks, puffins, razor-bills, geese, ducks, pelicans, gannets, and gulls; the penguin is as awkward on land as a seal, and as much at home in the sea. Among mammals the whales and porpoises are most truly aquatic, having a smooth and oily skin, a layer of blubber covering the internal viscera, and they are constructed to permit a long cessation of respiration while submerged; walruses and seals obtain their food in the sea, but breed and repose on rocks; their fore-limbs are formed into paddles, the hind-limbs are placed far back and are also paddles or oars, and every part of their internal structure is saturated with oil. Other aquatic mammalia are usually only web-footed and visit the water for prey.

Aquatic Plants are known in botany as Hydrophytes (Gk. ὕδωρ, water, φυτόν, plant), and the term of Hydrophyta has sometimes been applied to the algæ, rather illogically, since all water-plants do not belong to that div. The Hydrophytes form a large group of flowering plants, and differ from *Geophytes*, which are rooted in the soil, and *Aerophytes*, which live on other plants, chiefly because they dwell in the water. There are, how-ver, many incidental peculiarities of tructure and pollination in these lants which are not present in their eophyte relations, and when trans-anted to soil become extinct. They e not attacked by changes of temp. such a degree as their earth-grown ighbours, hence many of them are rennial. They frequently form nter-buds, which hibernate at the tom of the water and develop in early spring (*e.g. Utricularia*, or lder-wort, and *Potamogeton*, or d-weed). Besides this asexual oduction there is the ordinary al reproduction common to ering plants, many of the flowers g above the water and pollinated nsects or the wind, several, *e.g.* *ra*, or eel-grass, have submerged rs, of which the pollen grains are l-like and float at any depth of water until finally they reach a la stigma and so come to rest.

An interesting feature of th plants is their heterophyllous con tion, for there are no fewer than fo types of leaves observable in the Those which live beneath the surfa are not cuticularised, and are devo of stomata, while those which float o the surface have both cuticle (gener ally of a waxy nature) and stomata The four types are: (*a*) ribbon leaves (*b*) much-divided leaves; (*c*) awl shaped leaves; and (*d*) entire, rounded or lobed surface leaves. The ribbon leaves are found in plants which grow in running water, *e.g. water lobelia*; the much-divided leaves occur in still-water plants, *e.g. Ranunculus aquatilis* or water crowfoot; the awl-shaped leaves are also submerged, and are found on plants which usually can also grow on land, *e.g. Subularia*, or awl-wort; the floating leaves have large and conspicuous air-spaces, as exemplified in such plants as *Nymphæa*, or white water-lily, *Nuphar*, or yellow water-lily, and also *Ranunculus aquatilis*. The slimy nature of the hydrophytes is caused by a mucilaginous secretion from surface glands or hairs; the fibrous and vascular tissues are developed to a very slight extent.

Among other interesting A. P. may be mentioned *Elodea*, or Canadian water-weed, *Typha*, or bulrush (also known as cat-tail), *Nelumbium*, or sacred Lotus, *Ceratophyllum*, or horn-wort, *Sagittaria*, or arrow-head, *Nasturtium officinale*, or water-cress, *Iris pseudacorus*, or yellow flag, *Lemna*, or duckweed Among these are included a few plants which have their roots in water and the shoots in the air, *e.g.* the bulrush, and these are often classified as *marsh plants*: the algæ are treated of in a separate article. See J. C. Willis's *Flowering Plants*, 1908.

Aquatint, a means of etching on copper or steel to produce pictures in imitation of sepia and Indian ink drawings. Black resin is spread on a copper sheet on which the design is traced and treated with varnish and acid. It was invented in the eighteenth century, but is very little used to-day.

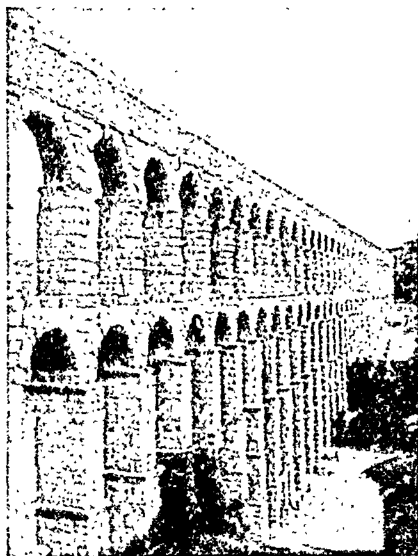
Aqua Tofana, a liquid poison invented by a woman named Tofana in the seventeenth century. It is tasteless, colourless, and very deadly, even in small quantities. It was sold in Rome and Naples by her daughter. The ingredients have never really been discovered, but it is supposed to be composed largely of arsenic and lead.

Aqua Vitæ (Lat., water of life), a term commonly applied to distilled spirits, having the same sense as the

Fr. 'eau de vie' and the Scotch or Irish 'whisky' or 'usquebaugh.' At one time largely used medicinally, and thought to have the power of prolonging life.

Aqueduct is an artificial conduit or channel for the conveyance of water, the term being usually applied to an open channel rather than pipes. As. were made on a large scale by the Egyptians and Babylonians, while some of the anct. Gk. and Rom. As. are used to this day. Most of the former are subterranean, and wonders of engineering skill, but perhaps this mode of getting water from the hills to the tns. was most extensively employed by the Roms. Rome itself was supplied by nine As., which brought the water over 60 m., and in some places were built nearly 200 ft. in height. These were formed either by erecting one or more rows of arcades across a valley and making them support one or two more level canals, or by boring through mt. sides which would have interrupted the water-course.

Ruins of As. can be found in many parts of Europe, among which may be mentioned the famous one at Pont du Gard at Nimes and Metz in France, and at Mayence in Germany there are also ruins of the same sort. Spain



AQUEDUCT AT SEGOVIA

has one at Segovia, and Portugal at Evora, while in Italy these ruins are very numerous.

The famous Spoleto A., 60 m. N. of Rome, erected in the seventh century, is a wonderful piece of work; and of a later date the Maintenon A. which was begun in 1684 but never finished, is one of the finest structures of this nature in the world, despite its incomplete state. Other As. of modern times and still in use are the Bridgewater Canal over the R. Irwell (the first in England), the Croton A. which supplies New York, the Marseilles A., over 60 m. in length, and also those at Manchester, Glasgow, Birmingham, Bombay, and Vienna. In certain parts of the U.S.A., especially California, there are timber As. termed *flumes*, which are frequently carried along steep mountain slopes and across valleys, supported on trestles. They are used to convey water for hydraulic mining, for irrigation, and timber transportation. The three largest As. in the U.S.A. are (1) the Catskill, supplying New York, (2) the Owens River, supplying Los Angeles, and (3) the 'Hetch Hetchy' A., expected to be completed in 193-, which is to serve San Francisco. The Catskill has a length of 92 m. (of which 14 m. are tunnel and 23 m. pressure pipes) and a capacity of 500 million gals. per day. The Los Angeles A., which cost about $- million to construct, has a capacity of 280 million gals. per day and a length of 223 m. The San Francisco A., when completed, will be about 156 m. long with a capacity of 4- million gals. per day.

Aqueous Humour is a watery fluid between the cornea and crystalline lens of the eye.

Aqueous Rocks, a term applied to rocks which have been formed by the chemical and mechanical action of the water or by organic deposition. They may be made respectively of chemical precipitates, of former rocks crumbled by the sea and cemented by softer material, or of decayed vegetable and animal life, sometimes called also *sedimentary rocks*.

Aquiba, or Akibah, Ben Joseph, called Barakiba by Epiphanius and Hieronymus, lived during the end of the first century and the early part of the second. He was a disciple and successor of the Rabbi Gamaliel. He joined the standard of the pseudo-Messias Bar - Cochebaur in Judæa, and when the Emperor Hadrian took Bethara, he ordered that Aquiba should have his skin taken off by an iron comb. He was buried at Tiberias. The authorship of the *Jezirah*, the chief book on cabalistic doctrines, has by some been ascribed to Aquiba.

Aquifoliaceæ (Lat. *aqua*, water, *folium*, leaf), a natural order of dicotyledonous trees and shrubs with leathery leaves. The order has been named after the *Ilex aquifolium*, the

holly, and has been characterised by Brongniart as Ilicineæ.

Aquila (Lat., an eagle), a constellation situated above and resting on the zodiacal constellations of Capricornus and Aquarius, and to be found due S. at 8 p.m. in the middle of September, at about 40° of elevation. In the Gk. mythology this constellation represented the eagle of Jupiter, and according to some the bird which was the tormentor of Prometheus. It is conjectured that the name was given when A. was near the summer solstice, and that the bird of highest flight was chosen to express the greatest elevation of the sun. A group of stars, now treated as part of A., were named Antinous by order of the Rom. Emperor Hadrian.

Aquila, Julius, a Rom. jurist, whose period is uncertain. He is one of the writers who were used for the compilation of the *Digest*, but it contains only two excerpts from him, both of which belong to his *Book of Answers*, *Liber Responsorum* (*Dig.* 26, tit. 7, s. 34; tit. 10, s. 12). He is called Gallus Aquila in the Florentine Index.

Aquila, Ponticus, a relative of Emperor Hadrian, lived in the second century, and translated the O.T. into Gk. Part of this version is found in Origen's *Hexapla*.

Aquila degli Abruzzi: (1) Prov. of Italy, between Apennines and prov. of Rome. Produces cereals, flax, hemp, and fruits. Area 2500 sq. m. Pop. 338,340. (2) Cap. tn. of above, on R. Aterno, 58 m. N.E. of Rome. Founded by Emperor Frederick II. on ruins of Amiternum. Almost destroyed by an earthquake in 1703, but is now a well-built and populous city; a bishop's see; and has a large trade in saffron, and paper, linen, and lace manufactures. Pop. 24,200.

Aquilegia, a genus of Ranunculaceæ, literally the *water-gatherer*, because the leaves collect water in their hollow. *A. vulgaris* is the columbine. The plants are found in temperate lands.

Aquileia, anct. tn. of Italy, at the ead of the Adriatic. It was built y the Roms. in 182 B.C., and strongly ortified, and at one time contained er 100,000 inhab. It was the key Italy on the N., and in A.D. 238 was besieged by Maximin, and in 2 destroyed by Attila. Many of people fled to the lagoons, where nice now stands. A new tn. was lt, but it never regained its former y. A cathedral was built in the onth century. It is now a poor of 2900 inhabitants.

quin, a tn. on S. coast of Hayti, Indies, 72 m. S.W. of Port au ce. Pop. of commune, 20,000.

uincum, an anct. Rom. citadel, ted near Budapest. The name is supposed to be a corruption of 'Ac quinque' (= five springs), and refer to the springs issuing from foot of the Blocksberg.

Aquinas, Thomas (c. 1226– (Thomas of Aquino), one of the m famous of scholastic theologians. was of noble descent, and was *b.* at t Castle of Roccasecca, the property his father, the Count of Aquino, in th territory of Naples. He began h education at the monastery of Mont Cassino, after which he studied in th university of Naples. Whilst ther he came under the influence of th Dominicans, and in spite of violent family opposition was at last permitted to enter their ranks. At the Dominican school of Cologne, whither he was sent, he came under the influence of the greatest teacher in Europe, Albertus Magnus. Later he followed his master to Paris, and was there granted the degree of bachelor of theology. About the year 1248 he returned to Cologne, still with the great Albertus Magnus, in the official position of second lecturer. Already the controversy between the university of Paris and the teaching friars had broken out, and Thomas had thrown himself with great zeal into the defence of his own order. So great was his zeal that later he was chosen to defend the attitude of the Dominicans before the pope himself. The hostility of the university to the Mendicant Orders prevented his taking his doctor's degree until 1257, when, together with the Franciscan Bonaventura, he received that degree. Ecclesiastical honours were his practically for the asking, but he refused them all. The popes themselves were beholden to him for advice, and he was held in high regard by Urban IV. and Clement III.; so great was his love of his own order that he refused the archbishopric of Naples. In 1263 he visited London to take part in the chapter of the Dominican order. The greater part of his later life was taken up in visits to various potentates and in the active service of his order. He was summoned again in 1272 to his professorial chair at Naples, and two years later he was summoned by Pope Gregory X. to the great council at Lyons. Ill though he was he set out, but *d.* at the Cistercian monastery of Fossa-Nuova on March 7, 1274. He was canonised by Pope John XXII. in 1323, and later took rank with the great fathers of the church at the decree of Pope Pius V. in 1567. He is regarded as the patron saint of all Catholic educational estabs., and is still upheld as the teacher of the orthodox Catholic faith.

His teachings are equally important

from the point of view of the theologian and the philosopher, and substantially his writings are regarded even to the present time as the authorities by the Rom. Church. His style was definite, clear, and concise, and the basis of his system seems to have been mainly that the two sources of knowledge were the mysteries of Christian faith and the truths of human reason. The mysteries of Christian faith are to be believed because they help even when they cannot be understood. His greatest book is the *Summa Catholicæ Fidei contra Gentiles*.

Aquino, an anct. but decayed tn. in the prov. of Campania or Terra di *Lavóro, in the kingdom of Naples*, stands 6 m. W. of San Germano, the anct. Casinum. It was a Rom. colony, and a large and populous city in the time of Strabo: the Via Latina passed through it. Juvenal, the Rom. satirist, was *b.* at or in the neighbourhood of Aquinum. Pescennius Niger, one of the competitors for the empire after the death of Pertinax, was also a native of this place. Pop. 2833.

Aquisgranum, anct. Rom. name for Aachen, or Aix-la-Chapelle (*q.v.*).

Aquitania, a Rom. prov. of Gaul, including the territory between the Pyrenees and the Garonne. The inhab. were of the Iberian tribes and Celtic families who had settled there. A. was conquered by the Goths in the early part of the fifth century, a century later by the Franks. After being a duchy for some time, it was united to the Fr. crown in 1137. Gascony became a part of A. in 1054. In 1152 it passed under the Eng. crown through the marriage of Henry II. with Eleanor, the divorced wife of the Fr. king, but it was lost to England again in 1452.

Aquitanus Sinus anct. Rom. name for the Bay of Biscay (*q.v.*).

Ara (Lat., an altar), a constellation situated to the S. of the zodiacal sign 'Scorpio,' and so low in the heavens as not to be visible in Great Britain. In it are one or two variable stars, one R Aræ being eclipsed once in every fifty-eight hours.

Ara (dimin. of *Araraca*, native name), a genus of tropical birds, the macaws, of the family Psittacidæ, or parrots, and tribe Cuculiformes. It has a curved and powerful beak, a long tail and vivid plumage, and can live in captivity. *A. macao* is found in Brazil, *A. militaris* in Mexico.

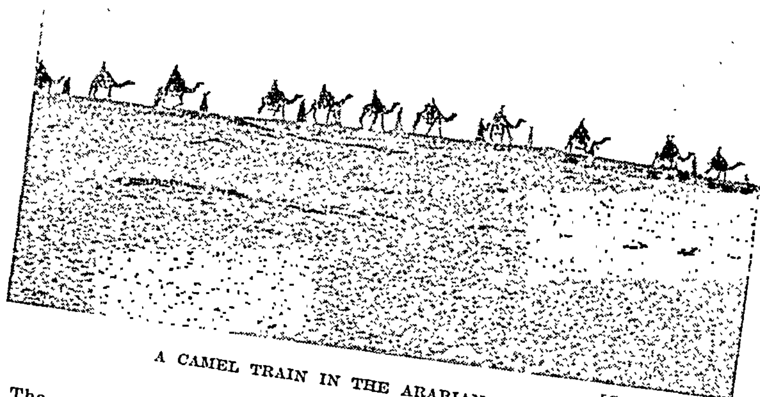
Arabesque, or Moresque, is a term in painting or sculpture applied to a special kind of ornamental frieze or border supposed to have been introduced into Europe by the Moors at the conquest of Spain, although traces have been found at Rome and Pompeii which prove it must have been known in Europe in some form previously. It is fantastic in design, and in many cases introduces griffins, dragons, and other fabulous monsters.

Arabgir, or Arabkir, a tn. in the prov. of Sivas in Asiatic Turkey. Manufs. silk and cotton goods; pop. about 20,000.

Arabia (Arab. *Jesiral-al-Arab*, 'The Tail or Peninsula of the Arabs'; Persian and Turkish, *Arabistan*), a peninsula forming the S.W. extreme of Asia. Bounded on the N. by Asiatic Turkey, on the E. by the Persian Gulf and Gulf of Oman, on the S. by the Gulf of Aden (Indian Ocean), and separated from Africa on the W. by the Red Sea and by the Gulf of Suez at the N.W. extreme. Lies between 12° 45′ and 34° 30′ N. and 32° 15′ to 60° E. The area is computed to exceed 1,200,000 sq. m., the length from N. to S. about 1500 m., and the greatest width about 1250 m. About one-third of the whole area is desert land, and the greater portion of the whole country is still unexplored, although it is known to be arid and practically uncultivated. The centre of A. forms a vast plateau or table-land falling from the mt. ranges on the W. coast to the R. Euphrates at the N.E. and the Persian Gulf on the E.; the height attaining to 8000 ft., while in some cases the summits even approximate 13,000 ft. Of the mts. Jebel-Musa, or the Mt. of Moses, has been identified as the Mt. Sinai (Horeb) of the O.T. The atmosphere is particularly hot and dry, and there is an almost total absence of clouds. Owing to the climatic conditions and the insufficient extent and height of the mts., little rain is attracted, with the natural consequence that there are few rivs., and those rarely permanent; the beds being dry except after heavy rains. To these conditions the unusual degree of cold sometimes felt may be ascribed, as snow and ice are frequently found on mts. of 6000 ft., although in Africa, across the Red Sea, they are only to be found at about twice this height. On the W. coast there is a summer rainy season of two or three months, but in the S. little rain falls and then in the winter. Among the hottest inhabited places in the world are Muscat and Mocha, where the temp. has been known to exceed 115° F. in the shade.

A. has been divided into three parts: (1) A. Felix, or Fruitful; (2) A Petræa, or Stony; (3) A. Deserta, or Desert. These dists. are not known as such to the Arabs, but may be described to include generally, (1) Hasa, Hadramant, Oman, and Yemen; (2) Hejaz; and (3) Nejd.

Owing to the small and irregular rainfall, little of the country is cultivated except in the wadies or valleys which receive the water from the mts. In the desert, however, occasional oases or fertile spots are found, and on the mts. large quantities of juniper and often pomegranates, with sometimes many of the fruits grown in European countries, such as plums and grapes. In the wadies and cultivated tracts of land along the coasts, coffee, cotton, figs, dates, almonds, cane-sugar, tamarinds, citrons, wheat, barley, rice, and the trees which yield gum-arabic and frankincense are produced.



A CAMEL TRAIN IN THE ARABIAN DESERT [*Canadian Pacific*

The mineral resources are little xnown, but include copper, iron, lead, nd many kinds of precious stones, uch as emeralds, carnelians, onyx, gate, and also marble and alabaster. n the is. of the Persian Gulf there re also extensive pearl fisheries.

Among the animal life are to be und the lion, tiger, jackal, antelope, nx, hyena, jerboa, monkey, gazelle, d-boar, and wild-ass, while os- ches, donkeys, goats, sheep, and n are reared. Perhaps the most standing of all is the camel, which rgely used for domestic purposes transport. By nature stupid bad-tempered, the camel has r been thoroughly domesticated, ough we have record in the Bible ob being the owner of a large ber. The average life of a camel ty-five years. The milk, being nutritious, is largely used, and Arabs cut the hair, from whicl coarse cloth is made. In crossing desert, camels, which have be aptly termed 'ships of the deser frequently go for five days witho drink, and are capable of carrying load of 600 to 900 lbs. Well know too, is the beautiful breed of Arabia horses, whose great qualities ar speed and endurance.

It is probable that the various Semitic peoples migrated from A.; the Jews and Arabians being the prin branches of that race. Arabian historians trace the people back to two sources, Ishmæl and Kahtan (sometimes called Joktan), distinguishing the branches by the names of Ishmaelites and Kahtanites. The former, living in the N., are considered as naturalised Arabs by the S. or pure Kahtanites. This distinction is traditional only, as a number of the Ishmaelites have settled down to an agric. life among the Kahtanites, forsaking the wandering tribes of Bedouins, while others of the Kahtanites have taken to a nomadic life in the deserts. So far back as we can trace A. has had a great influence in the spread and cultivation of literature, and for a long time was much in advance of the rest of the world in literature, science, and art. At the present day illiteracy even among the Bedouins is unknown; reading, writing, and some mathematics being taught to every child. Invariably

the people live in tribes whose chieftains, usually hereditary, but sometimes elected by the men, have little actual authority other than they secure by their own merit in counsel. Tribal wars, which were at one time intermittent, have practically ceased, but politically each tribe is still really independent of the others. Mohammed, preaching the religion of Islam (which imposed on its followers the pilgrimage to the Kaaba at Mecca) and a united A., did indeed for a time bind the tribes together throughout the whole peninsula, but this state did not long survive his death. The effect, however, on the language was to make that of the Koran, Arabic, universal throughout the land. While the laws of property are but poorly defined, good faith is universal and disputes are settled by meetings of the tribe. Courage, lack of imagination, passion, love of poetry, and hospitality are characteristics, while usually the Arab is proud and quick-witted. Generally he has but one wife, although the more well-to-do have frequently several, divorce being secured at will by pronouncement by the husband.

In view of the isolated situations of the cultivated plots of land and the consequent nomadic tendencies of the inhab., the early history of A. is the history of numerous small tribes and, as is usual in such cases, little record of the doings of the people is left. We have, however, some knowledge of wars made upon the Arabians by neighbouring countries from the writings of their historians, and from inscriptions which have been found it is thought possible that, by exploration, further writings may be discovered which will throw light on the earlier political life of the country. So that, if and when found, the script may be important in its relation to our knowledge of the migrations of the Semitic races. From these writings we have information of a people known as Sabæans or Himyarites, and it was over this people that the Queen of Sheba, who is mentioned in the Bible as having journeyed to see Solomon, reigned. No record can be found, however, in the Sabæan writings of this queen. These records date to *c.* 1500 B.C., and at this period we find record of another people, the Minæans, who dwelt in Yemen and were at war with the Sabæans leagued with the Assyrians. It had been the intention of Alexander the Great to conquer the land, but he died before the attempt was made. Time and again through the centuries the Abyssinians had invaded the country of the Sabæans, frequently obtaining control for a time, but only to be thrown out by the inhab. Augustus Octavianus sent an army into Yemen under Ælius Callus to obtain command of the route to India, but was defeated. From this time until Mohammed came into power the country was sometimes independent and sometimes under foreign control, and internally, the N. was almost consistently antagonistic to the S.

The power of the prophet will be better realised when it is considered that the whole pop. was divided into small and more or less independent tribes, whose relations to each other were generally unfriendly. With the growth of Mohammed's power these tribes laid aside their feuds, and, joining under his command, drove out or slew the Jewish inhab. It was not, however, until after the prophet's death that the gospel of Islam spread actively beyond A., as his own time had been occupied in subjugating the tribes, one by one, and bringing them all into his camp. Egypt, the N. of Africa, Palestine, and the Sp. Peninsula were all welded into one vast empire with A. In the sixteenth century, however, A., which had again become disunited, was attacked by, and portions came into the hands of, sev. foreign powers, notably the Turks and Portuguese. By degrees the tribes resumed their authority, driving out the invaders. In the middle of the eighteenth century Mohammed ibn-Abd-il-Wahab came forward to restore the pure faith of Islam, and founded a dynasty which expanded and ultimately, after his death, included Medina and Mecca. In 1811 a war took place between this dynasty and the Viceroy of Egypt, Mahommed Ali, which terminated in the conquest by Ibrahim Pasha of the Wahabi monarchy in 1818. Twenty years or so later, however, the Wahabis regained their freedom, but were separated from the dist. of Oman, which declared its independence.

The Arabic language is one of the old Semitic tongues and is known where the faith of Islam is received. The classical Arabic of the Koran is recognised as the standard of purity; in this form it is spoken in central A., with differences of dialect in the rest of the country. That used in Assyria and Egypt is less pure.

In appearance the Arab is sinewy, of medium height, with sharply cut features and a brown complexion. His actions are athletic and energetic, if a little restrained.

The pop. is various, estimated from 3,000,000 to 5,000,000. The prin. tns. are Mecca, Medina, Aden and Muscat.

The most profound chan in A. by the operation of

War was the hastening of the evolution of the anct. tribal organisation of the Bedouins into the communal and civic life of the State. This transition is, of course, very far from complete. The patriarchal system is still to be found and the civic life of the Arab of Medina or even of Baghdad is as yet far removed from that of a European nation. Arab prejudices and traditions die hard and it is only during the last half-century that the old pursuit of agriculture has been recognised as a fit occupation for other than the descendants of slaves. Immobile as the Oriental generally is, the Arab, in particular, has leanings towards Western ideas, though in so barren a country the march of progress is slow. The nomad life still has innumerable followers, while among the powerful Wahabi tribes, the most masterful in A., a reaction to orthodox Islamism, with its abhorrence of Occidental customs, is an ever-present menace to British interests in India, Egypt, and the Middle East. But the growth in the past 30 years of a strong Arab nationalist sentiment among the tribes E. of Syria and in the borderland of Iraq has taken deep root. The patriarchal organisation had received its death-blow, and with its decay, revolt against the Turkish hegemony grew. In the Great War the Turks suffered incalculably in prestige through their resounding defeats. Always chafing against Turkish domination, the Arabs were not loth to avail themselves of the opportunity of throwing off the yoke. It required no little experience in Arab psychology to win their alliance; but eventually the principal Arab chieftains threw in their lot with the Allies and co-operated effectively in the ultimate overthrow of the Turk.

The chief figure in the Anti-Turkish revolt of the last 15 years was Ibn Saud, the present Sultan of Nejd and successor to Hussein as King of the Hejaz. It was his work, before the Great War, in welding the agglomeration of Wahabi tribes into communal organisations of some political significance which set the seal on what was to follow. Having wrested the Hassa region from the Turks in 1913–14, he had paved the way for the eviction of the Turk, during the Great War, from Yemen, the Hejaz, and other regions.

In the Great War Ibn Saud and the Shereef of Mecca allied themselves with Great Britain, while Hussein, King of the Hejaz and Ibn Rashid whose dynasty had been wrested from the Nejd capital Riejadh in ... by Ibn Saud, were in alliance with the Turks. Ibn Saud ... defeated in 1915 at the Battle ... Jurrab, and took no further ... in hostilities till the last year of ... War. Meanwhile, in the Hejaz ... British forces were engaged in successful operations for the Hejaz Railway (1916–18) and in the Akaba, Tafile and Ma'an regions, (1917–18) while in S. Arabia, successful operations were carried out in the Bab el-Mandeb (1914–15). Arab forces in revolt against the Turks attacked Medina in June 1916 and in the same year captured Jeddah, Mecca, and Taif; and other Arab forces, under Sheikh Feisal (later King of Iraq), co-operated with the British Army under General Allenby in their operations beyond Jordan and in the final offensive in Syria. In 1918 Ibn Saud, encouraged by the defeat of the Turks, renewed his campaign against Ibn Rashid but with only indifferent success. In this renewal of hostilities he was primarily anxious to secure the oasis of Khurma on the W. frontier of the Nejd, which territory, however, Hussein claimed as part of the Hejaz. This dispute precipitated the Arabian War of 1919, when Ibn Saud routed Hussein's forces at Turaba and in due course annexed Khurma and, later, Abhah and other territories in Asia. In the following two years his victorious Wahabis seized Hail, the capital of the Jubal Shammar provinces in Central A., the Jauf region of the Shalan dynasty (1922), and the Kharbar and Taima provinces on the frontiers of the Hejaz (1922), until, by 1926, his possessions and influence extended throughout desert A.

In this conflict the British Government, from a desire to act with the utmost impartiality, was faced with a situation of extreme delicacy. It had at one time or another during and after the Great War negotiated successfully with most of the Arabian Shereefs. In 1915 it had induced Hussein, in consideration of a guarantee of independence to all the Arab states, to head the revolt against the Turks. Hussein was at that time only Grand Shereef of Mecca, but in 1916–17 he had seized Mecca and Jeddah and proclaimed himself King of the Arabs, but this grandiose title was not recognised by any other nation, for even Great Britain recognised him only as the 'King of the Hejaz.' In April 1921 the British government announced its recognition of his son, the Amir Abdullah as ruler of Transjordan, subject to constitutional guarantees, and in August of the same year proclaimed a younger son, the Amir Feisal, as King of Iraq. This astute com-

made a law that in future all his wives should be executed on the morning after the marriage. This law was duly carried out, until the Sultan wedded Shahrazad, the daughter of his grand-vizier. This lady was a matchless raconteuse, and by the expedient of leaving off every night in the midst of a fresh tale of surpassing interest, she induced the sultan to defer her execution until the day after, for a thousand and one nights, when her doom was postponed *sine die*. The tales were first introduced into Europe at the beginning of the eighteenth century, by means of the Fr. translation of Antoine Galland. Of some of them no manuscript is known, and M. Galland took them down from the mouth of a Syrian friend. Lane was the first Englishman to trans. them worthily, and his opinion is that in their present form they date back to about 1500.

Arabic, The. A White Star liner sunk without warning by Ger. submarine on Aug. 19, 1915, off Queenstown. The ship was carrying at the time several American subjects, some of whom perished. As a result of American protests the Ger. Government offered full satisfaction to America and undertook not to sink liners without warning and without providing for the safety of the lives of non-combatants, on condition that the ship made no attempt to escape or resist. The worthlessness of this pledge was soon exposed.

Arabic Numerals are the numerals 1 to 9 with the character zero (0). They came originally from India.

Arabii, Arabici, or Arabians, a small sect of Christians which existed in the third century, chiefly in Arabia. They held that the soul would perish with the body, but that both would be restored at the Resurrection. At the council of Arabia, *c.* 247, Origen confuted this opinion. *See* Eusebius, *Historia Ecclesiastica*, vi. 37; St. Augustine, *De Hæresibus liber*, c. 83; J. F. Buddens, *De Arabicorum Hæresi*, 1713.

Arabin, Arabic Acid, or Gummic Acid, a constituent of gum arabic. Gum arabic consists of the potassium and calcium salts of A. A. The A. A. may be set free by adding hydrochloric acid to the mucilage, and may be separated by dialysis, or passing through parchment paper, as the gum passes through with great diffi- ulty. Alcohol added to the solution recipitates the acid as a white morphous mass.

Arabi Pasha (1840–1911), leader of ne insurrectionary party in Egypt, 382, *b.* of fellah parents in Lower gypt; began life as a labourer, and rved in the Egyptian army as a private soldier for twelve years organised a national party in op tion to the Anglo-French contro tained the deposition of the min 1881, and became minister of w the new cabinet, 1882. He set u an autocrat, withdrawing the bud from the Eng. and Fr. control This act resulted in war with E land, whose fleet bombarded A andria, July 11–12. On Sept. 13, 18 A. P. was defeated at Tel-el-Ke taken prisoner at Cairo, and expel to Ceylon. The result of his revolt w the establishment of British oversig in Egypt. Pardoned by the Briti gov. in 1900, he returned in 1901.

Arabis is the typical plant of th Arabidæ, a tribe of Cruciferæ. Th species which grow in Britain ar known as rock-cress, and to th same tribe belong the water-cress stock, and wallflower.

Arabistan: (1) A general Oriental name for Arabia and other dists. inhabited by Arabs. 2. A prov. of Persia, once known as Khuzistan.

Arabkir, tn. of Asia Minor, on trade route between Aleppo and Trebizond, 107 m. N.W. of Diarbekir. Has large cotton manufs. Pop. 25,000.

Arabs' Gulf, situated on the N. coast of Africa to the W. of Alexandria. Its site corresponds to the gulf called Plinthinetes.

Aracaju, city and port of Brazil, and cap. of Sergipe. Pop. 6000.

Aracari, the native name of the *Pteroglossus aracari*, one of the toucans. It belongs to the Rhamphastidæ, is allied to the woodpeckers, and is found in tropical America.

Aracaty, tn. and port of Ceara, Brazil. Important commercial centre. Pop. 27,126.

Araceæ, a natural order of monocotyledonous, chiefly tropical, plants. The flowers are monœcious or monoclinous, the perianth is absent or has from four to six leaves, there are one to eight stamens, often united into a *synandrium*, the ovary often consists of one carpel; the fruit is a berry, and the seeds are sometimes exalbuminous. It contains about 1000 species, of which typical flowers are the *Arum maculatum*, or cuckoo-pint, and *Zantedeschia æthiopica*, or trumpet-lily.

Arachis, a plant of the order Leguminosæ which grows in tropical parts of Asia, America, and Africa. It yields a sweetish oil used to adulterate olive oil. It has pale yellow flowers, and the pod is forced into sandy soil by the elongation of its stalk, and there it ripens. *A. hypogca* is the earth-nut or pea-nut.

Arachnida (Gk. ἀράχνη, spider), a class of arthropods, including spiders, scorpions, and mites, differing from insects in having four pairs of legs, no

antennæ, a fused head and thorax, and simple eyes varying in number from two to twelve. They are mostly carnivorous; the scorpion has poison-glands leading to the sting. There are nine orders: the *Scorpionidea*, or scorpions; *Pedipalpi*, or whip-scorpions; *Araneida*, or spiders; *Palpigradi*; *Solifugæ*, or wind-scorpions; *Pseudoscorpionidæ*, or book-scorpions; *Podogona*; *Phalangidæ*, or harvest-men; *Acarina*, or mites. Two doubtful orders also exist: the *Xiphosura*, or king-crabs, and the *Eurypterida*. For further information see under individual heads.

Arachnoid Membrane, the thin, web-like membrane of the brain which lies between the pia mater and the dura mater. It surrounds the nerve-centres, and contains no blood-vessels: it can be separated from the dura mater, to which it adheres by its parietal layer, only by dissection.

Arachnoides (Gk. ἀράχνη, spider, εἶδος, resemblance), an Echinodermatous fossil of the family Scutellidæ and order Clypeastroida. It receives its name from the resemblance of the markings to a spider's web.

Arachosia, a prov. of the anct. Persian empire, lying in the basin of the Helmand R., and corresponding to the S.E. part of modern Afghanistan. Kandahar occupies the site of its anct. capital, Arachoton, founded by Alexander the Great.

Arad, a tn. in Rumania; on the bank of the R. Maros. It is an important railway centre, and has a large trade in spirits, wine, corn, and tobacco. It was the scene of much fighting in the seventeenth century in the wars between the Turks and the Hungarians, and in the revolutionary war of 1849 was once captured by the Austrians. Pop. 63,000. New A. is on the opposite bank of the river. The prov. of A. is 2490 sq. m. in extent.

Aræometer, or Areometer, an instrument used to discover the specific gravity of liquids; a hydrometer.

Araf, the Islamic Halfway region or Purgatory between Hell and Heaven.

Arafat, Mt., or Jebel-en-rahm (Hill of Mercy), is a granite hill 15 m. S. of Mecca. It is much visited by Mohammedan pilgrims and is supposed to be the meeting-place of Adam and Eve after their expulsion from Paradise.

Arafura, or Alfura Sea, a div. of the Pacific Ocean, lying between the N. coast of Australia and the W. part of New Guinea, partly enclosed by Papua, the Aru Is., Timor, etc.

Arago, Alfred (1816–1892), brother of François Victor Emmanuel A., was a painter. He was a pupil of Paul Delaroche, and most of his pictures had as their subjects historical incidents. He was appointed a member of the committee for the International Exhibition of 1855.

Arago, Dominique François (1786–1853), *b.* at Estagel and *d.* at Paris, was a Fr. physicist and astronomer. He was appointed secretary to the Bureau des Longitudes, and in 1806 helped Biot to measure an arc of the meridian. At the age of twenty-three he became a member of the Academy of Sciences, and afterwards director of the Observatory. In 1830 he was appointed perpetual secretary to the Academy of Sciences, Paris, and in 1848 was a member of the provisional gov. He pub. works on astronomy, magnetism, the polarisation of light and electricity, the titles of some of which are: *Recueil d'Observations Géodesiques, Astronomiques, et Physiques*, 1818; *Astronomie populaire*, 1834; and *Notices Biographiques*. His complete works were pub. in 1854–62. He was held in great esteem and reputation in all Europe; and opposed Louis Napoleon, and refused to take the oath of allegiance, 1852. *See* Audiganne's *Arago*, 2nd ed. 1869.

Arago, Etienne Vincent (1802–92), an author and politician, and brother of Dominique François A., was *b.* at Estagel and *d.* at Paris. Amongst his comedies are: *L'Anneau de Gyges, L'Amour de la Guerre, L'Avocat, La Fleuristé, Les Malheurs d'un joli garçon, Les Pages de Bassompierre, Le Cabaret de Lustuoru, Le Démon de la Nuit, Les Mémoires du Diable, Brelan de troupiers, Une Invasion de Grisettes*, and *Les Aristocraties*. He was exiled in 1849 for the republican side which he took in politics, but he returned in 1859. He also wrote poems, and in 1878 became archivist in the Ecole des Beaux-Arts.

Arago, Jacques (1799–1855), a Fr. author and traveller, brother of Dominique François, was *b.* at Estagel and *d.* in Brazil. In 1817 he took part in an expedition round the world. He returned to France, wrote romances, and became director of the theatre at Rouen, 1835. Amongst his works are: *Promenade autour du Monde*, 1822; *Le Noviciat diplomatique*, 1834; *Le Cadet de Gascoigne*, 1836; *Voyage autour du Monde*, 1838–40; and *Souvenirs d'un Aveugle*. Although he became blind, it did not put an end to his travels and his writings.

Arago, Jean (1788–1836), *b.* at Estagel and *d.* in Mexico, was the brother of Dominique François A. He was a Fr. general in the service of Mexico. He went to the U.S. in 1817, and then to Mexico, where he fought for independence against the Spaniards. When the Spaniards were defeated A. was made general.

Aragon, formerly a kingdom of

made a law that in future all his wives should be executed on the morning after the marriage. This law was duly carried out, until the Sultan wedded Shahrazad, the daughter of his grand-vizier. This lady was a matchless raconteuse, and by the expedient of leaving off every night in the midst of a fresh tale of surpassing interest, she induced the sultan to defer her execution until the day after, for a thousand and one nights, when her doom was postponed *sine die*. The tales were first introduced into Europe at the beginning of the eighteenth century, by means of the Fr. translation of Antoine Galland. Of some of them no manuscript is known, and M. Galland took them down from the mouth of a Syrian friend. Lane was the first Englishman to trans. them worthily, and his opinion is that in their present form they date back to about 1500.

Arabic, The. A White Star liner sunk without warning by Ger. submarine on Aug. 19, 1915, off Queenstown. The ship was carrying at the time several American subjects, some of whom perished. As a result of American protests the Ger. Government offered full satisfaction to America and undertook not to sink liners without warning and without providing for the safety of the lives of non-combatants, on condition that the ship made no attempt to escape or resist. The worthlessness of this pledge was soon exposed.

Arabic Numerals are the numerals 1 to 9 with the character zero (0). They came originally from India.

Arabii, Arabici, or Arabians, a small sect of Christians which existed in the third century, chiefly in Arabia. They held that the soul would perish with the body, but that both would be restored at the Resurrection. At the council of Arabia, c. 247, Origen confuted this opinion. *See* Eusebius, *Historia Ecclesiastica*, vi. 37; St. Augustine, *De Hæresibus liber*, c. 83; J. F. Buddens, *De Arabicorum Hæresi*, 1713.

Arabin, Arabic Acid, or Gummic Acid, a constituent of gum arabic. Gum arabic consists of the potassium and calcium salts of A. A. The A. A. may be set free by adding hydro-chloric acid to the mucilage, and may e separated by dialysis, or passing hrough parchment paper, as the um passes through with great diffi-ulty. Alcohol added to the solution recipitates the acid as a white norphous mass.

Arabi Pasha (1840–1911), leader of e insurrectionary party in Egypt, 32, *b.* of fellah parents in Lower ypt; began life as a labourer, and ved in the Egyptian army as a private soldier for twelve years. organised a national party in op- tion to the Anglo-French control tained the deposition of the minis 1881, and became minister of wa the new cabinet, 1882. He set u an autocrat, withdrawing the budg from the Eng. and Fr. controlle This act resulted in war with En land, whose fleet bombarded Ale andria, July 11–12. On Sept. 13, 188 A. P. was defeated at Tel-el-Keb taken prisoner at Cairo, and expelle to Ceylon. The result of his revolt wa the establishment of British oversigh in Egypt. Pardoned by the Britis gov. in 1900, he returned in 1901.

Arabis is the typical plant of the Arabidæ, a tribe of Cruciferæ. The species which grow in Britain are known as rock-cress, and to the same tribe belong the water-cress, stock, and wallflower.

Arabistan: (1) A general Oriental name for Arabia and other dists. inhabited by Arabs. 2. A prov. of Persia, once known as Khuzistan.

Arabkir, tn. of Asia Minor, on trade route between Aleppo and Trebizond, 107 m. N.W. of Diarbekir. Has large cotton manufs. Pop. 25,000.

Arabs' Gulf, situated on the N. coast of Africa to the W. of Alexandria. Its site corresponds to the gulf called Plinthinetes.

Aracaju, city and port of Brazil, and cap. of Sergipe. Pop. 6000.

Aracari, the native name of the *Pteroglossus aracari*, one of the toucans. It belongs to the Rhamphastidæ, is allied to the woodpeckers, and is found in tropical America.

Aracaty, tn. and port of Ceara, Brazil. Important commercial centre. Pop. 27,126.

Araceæ, a natural order of monocotyledonous, chiefly tropical, plants. The flowers are monœcious or monoclinous, the perianth is absent or has from four to six leaves, there are one to eight stamens, often united into a *synandrium*, the ovary often consists of one carpel; the fruit is a berry, and the seeds are sometimes exalbuminous. It contains about 1000 species, of which typical flowers are the *Arum maculatum*, or cuckoo-pint, and *Zantedeschia æthiopica*, or trumpet-lily.

Arachis, a plant of the order Leguminosæ which grows in tropical parts of Asia, America, and Africa. It yields a sweetish oil used to adulterate olive oil. It has pale yellow flowers, and the pod is forced into sandy soil by the elongation of its stalk, and there it ripens. *A. hypogea* is the earth-nut or pea-nut.

Arachnida (Gk. ἀράχνη, spider), a class of arthropods, including spiders, scorpions, and mites, differing from insects in having four pairs of legs, no

antennæ, a fused head and thorax, and simple eyes varying in number from two to twelve. They are mostly carnivorous; the scorpion has poison-glands leading to the sting. There are nine orders: the *Scorpionidea*, or scorpions; *Pedipalpi*, or whip-scorpions; *Araneida*, or spiders; *Palpigradi*; *Solifugæ*, or wind-scorpions; *Pseudoscorpionidæ*, or book-scorpions; *Podogona*; *Phalangidæ*, or harvest-men; *Acarina*, or mites. Two doubtful orders also exist: the *Xiphosura*, or king-crabs, and the *Eurypterida*. For further information see under individual heads.

Arachnoid Membrane, the thin, web-like membrane of the brain which lies between the pia mater and the dura mater. It surrounds the nerve-centres, and contains no blood-vessels: it can be separated from the dura mater, to which it adheres by its parietal layer, only by dissection.

Arachnoides (Gk. ἀράχνη, spider, εἶδος, resemblance), an Echinodermatous fossil of the family Scutellidæ and order Clypeastroida. It receives its name from the resemblance of the markings to a spider's web.

Arachosia, a prov. of the anct. Persian empire, lying in the basin of the Helmand R., and corresponding to the S.E. part of modern Afghanistan. Kandahar occupies the site of its anct. capital, Arachoton, founded by Alexander the Great.

Arad, a tn. in Rumania; on the bank of the R. Maros. It is an important railway centre, and has a large trade in spirits, wine, corn, and tobacco. It was the scene of much fighting in the seventeenth century in the wars between the Turks and the Hungarians, and in the revolutionary war of 1849 was once captured by the Austrians. Pop. 63,000. New A. is on the opposite bank of the river. The prov. of A. is 2490 sq. m. in extent.

Aræometer, or Areometer, an instrument used to discover the specific gravity of liquids; a hydrometer.

Araf, the Islamic Halfway region or Purgatory between Hell and Heaven.

Arafat, Mt., or Jebel-en-rahm (Hill of Mercy), is a granite hill 15 m. S. of Mecca. It is much visited by Mohammedan pilgrims and is supposed to be the meeting-place of Adam and Eve after their expulsion from Paradise.

Arafura, or Alfura Sea, a div. of the Pacific Ocean, lying between the N. coast of Australia and the W. part of New Guinea, partly enclosed by Papua, the Aru Is., Timor, etc.

Arago, Alfred (1816–1892), brother of François Victor Emmanuel A., was a painter. He was a pupil of Paul Delaroche, and most of his pictures had as their subjects historical incidents. He was appointed a member of the committee for the International Exhibition of 1855.

Arago, Dominique François (1786–1853), *b.* at Estagel and *d.* at Paris, was a Fr. physicist and astronomer. He was appointed secretary to the Bureau des Longitudes, and in 1806 helped Biot to measure an arc of the meridian. At the age of twenty-three he became a member of the Academy of Sciences, and afterwards director of the Observatory. In 1830 he was appointed perpetual secretary to the Academy of Sciences, Paris, and in 1848 was a member of the provisional gov. He pub. works on astronomy, magnetism, the polarisation of light and electricity, the titles of some of which are: *Recueil d'Observations Géodesiques, Astronomiques, et Physiques*, 1818; *Astronomie populaire*, 1834; and *Notices Biographiques*. His complete works were pub. in 1854–62. He was held in great esteem and reputation in all Europe; and opposed Louis Napoleon, and refused to take the oath of allegiance, 1852. *See* Audiganne's *Arago*, 2nd ed. 1869.

Arago, Etienne Vincent (1802–92), an author and politician, and brother of Dominique François A., was *b.* at Estagel and *d.* at Paris. Amongst his comedies are: *L'Anneau de Gyges, L'Amour de la Guerre, L'Avocat, La Fleuristé, Les Malheurs d'un joli garçon, Les Pages de Bassompierre, Le Cabaret de Lustuoru, Le Démon de la Nuit, Les Mémoires du Diable, Brelan de troupiers, Une Invasion de Grisettes*, and *Les Aristocraties*. He was exiled in 1849 for the republican side which he took in politics, but he returned in 1859. He also wrote poems, and in 1878 became archivist in the Ecole des Beaux-Arts.

Arago, Jacques (1799–1855), a Fr. author and traveller, brother of Dominique François, was *b.* at Estagel and *d.* in Brazil. In 1817 he took part in an expedition round the world. He returned to France, wrote romances, and became director of the theatre at Rouen, 1835. Amongst his works are: *Promenade autour du Monde*, 1822; *Le Novicial diplomatique*, 1834; *Le Cadet de Gascoigne*, 1836; *Voyage autour du Monde*, 1838–40; and *Souvenirs d'un Aveugle*. Although he became blind, it did not put an end to his travels and his writings.

Arago, Jean (1788–1836), *b.* at Estagel and *d.* in Mexico, was the brother of Dominique François A. He was a Fr. general in the service of Mexico. He went to the U.S. in 1817, and then to Mexico, where he fought for independence against the Spaniards. When the Spaniards were defeated A. was made general.

Aragon, formerly a kingdom of

Spain, but divided since 1833 into the three provs. of Huesca, Teruel, and Saragossa. Bounded on the N. by the Pyrenees, on the E. by Catalonia and Valencia, and on the W. by Castile and Navarre. The prov. falls naturally into two divs., the level plain of the valley of the Ebro, and the highlands of Upper A. The Ebro is the prin. riv., and receives numerous tribs. from the Pyrenees to the N. and the mts. of the S. The central plain is sterile and is shut off from the sea breezes, it has practically no vegetation save grasses. The highlands, however, are noted for the magnificence of their forests and scenery, as also for their fertility. Wheat, maize, rice, and oil are produced in considerable quantities. One of its chief exports is Merino wool.

The people are of pure race and are probably more closely allied to the Castilians than to the Catalans. Historically it has been a Rom. prov., and after the expulsion of the Moors in 1131 became, under James I., an important kingdom. The union of A. and Castile, under Ferdinand and Isabella, formed the nucleus for the united Sp. kingdom.

Aragon Canal, constructed from Saragossa to Tudela by Pignatelli, the It. engineer, during the reign of Charles III. of Spain (1760–88). It had been previously begun in 1529 by the Emperor Charles V. It is 80 m. long, and has an average depth of 9 ft., and a breadth of 69 ft., and is navigable by vessels of 80 tons.

Aragon River, riv. of Spain, rising in the Pyrenees in Aragon, and flowing about 80 m. in a S.W. direction through Navarre to join the Ebro at Alfaro.

Aragon, Tullia (1510–65), It. poetess of sixteenth century. A natural daughter of Peter Tagliavia d'A., Archbishop of Palermo, Famous for beauty and learning. Her works, which had a considerable contemporary reputation, include *Rime*, 1547; *Dialogo dell' infinità d'Amore*, 1547; *Il Meschino o il Guerino*, 1560.

Aragona, a tn. of Sicily, situated 6 m. N.N.E. of Girgenti. It possesses the old castles of the A. princes. Sulphur is successfully mined near the town. Its pop. is 15,530.

Aragonite, a mineral consisting of calcium carbonate, $CaCO_3$. It has a sp. gr. of from 2·92 to 3·28 and a hardness of from 3½ to 4. It crystallises in rhombic prisms, and twinning on the prism planes is a frequent phenomenon.

A. is found in Aragon, Hungary, Sicily, Cumberland, and in the neighbourhood of hot springs, as at Carlsbad. It is distinguished from the other variety of calcium carbonate, calcite, by its greater sp. gr. and its different form of crystallisation.

Aragua, a state of Venezuela, constituted under the re-division of 1904, and lying mainly within the parallel ranges of the Venezuelan Cordillera. Products: coffee, cacao, sugar. Chief towns: La Victoria, the cap. (pop. 7800), and Barbacoas (pop. 13,000). Pop. of A. about 96,000.

Araguya, or Rio Grande, a riv. in Brazil, which has a length of about 1250 m. and flows into the Tocantins, close to San Joao.

Araja, Francis (1700–70), an It. musical composer. The first opera in the Russian language was composed by him, entitled *Cephalus and Procris.*

Arakan, a div. of Lower Burma, on the Bay of Bengal between Pegu and Chittagong, having an area of about 14,500 sq. m. The old cap. bears the same name, but is sometimes called Mro-houng to-day, formerly a large tn., but now dwindled down to little over 2000 people. The dist. exports rice, timber, tobacco, and cotton. The majority of the natives are Buddhists.

Aral, *see* BAHREIN ISLAND.

Aral, Sea of, a salt-water lake in Asia, and after the Caspian Sea is the largest inland sheet of water in this continent. It is in Russian ter., and is about 270 m. long by 165 broad. It is shallow, and nowhere has a greater depth than 220 ft. Two great rivs. drain themselves into this lake, the Syr Daria (the Jaxartes of old) and the Amu Daria (Oxus). At one time it is thought to have formed part of the Caspian Sea, as only 80 m. of low, sandy, and marshy lands now separate them. It has no outlet, but much water is drawn off by evaporation. A number of small is. are dotted about over it, mainly towards the E. shore. By references of anct. writers it is probable that its shape has altered considerably, and part of its area was once dry land.

Aralia, a genus of the order Araliaceæ, belongs to India, China, and other tropical countries. *A.* (or *Fatsia*) *papyrifera* is a Japanese tree, from the pith of which rice-paper is made. *A. ginseng* has a root which is used as a tonic by the Chinese.

Araliaceæ, an order of tropical dicotyledons, most of which are trees or shrubs. The flowers are bisexual, regular, epigynous; the calyx consists of five small sepals, five petals, five stamens, and an inferior ovary of five united carpels, each bearing one ovule. The fruit is generally a drupe (*cf.* cherry). It contains many genera, of which *Hedera* includes the ivy.

Aram, or Aramæa, meaning 'highlands,' a term including all the country N.E. of Palestine. Comprised

within its limits are Syria, Babylonia, Mesopotamia. The language spoken is Aramaic. This tongue is a branch of the Semitic, which is divided into two parts, the W. Aramaic or Syriac, and the E. Aramaic, or, as it is erroneously termed, Chaldee. In Palestine itself Syrian was the language in vogue during the time of Christ. The pure Heb., the language in which the whole of the N.T. was written, was changed after a period of Babylonic captivity to Aramaic. In quoting from the O.T. Jesus Himself uses Aramaic, and in the Talmud, especially that part appertaining to Aramæa, many traces of Aramaic influence are found. In the *Targums* also, the whole work is composed in Aramaic.

At the present day Aramaic is archaic, though while it was in use it happened to be the poorest in quality of all the Semitic group. Arabic and Persian succeeded it. The inhab. of A. are called Aramæans, and the name itself is strictly biblical. In early times the prin. riv. was the Orontes, and to-day this riv. is the chief waterway of Syria, so it can be said that the present site of Syria coincides with that of A. As far back as Judges mention is made of an Aramæan king extending his territories as far as Palestine.

Aram was a conqueror who went from the W., or Aramæan, or Syrian Cappadocia, into the highlands of Armenia, and from whom the present name of Armenia is derived. (*See Moses of Chorène* i. 13, p. 83, ed. Whiston.) *This* circumstance explains the fact that the Aramæans and Armenians are sometimes confounded (as in Strabo, pp. 41, 42, ed. Casaub.), and that the Armenians themselves do not use the name of Armenia, which first occurs in Herodotus and other Gk. authors.

Aram, Eugene (1704–59), an erudite Eng. schoolmaster who gained notoriety by the murder attributed to him. The story of the crime is the theme of Hood's poem, *Dream of Eugene Aram*; and of Lytton's romance, *Eugene Aram*. Born at Ramsgill, Yorkshire, A. came of humble parentage, but he manifested at an early age a desire for learning. He married early and settled as a schoolmaster at Netherdale. In 1745 a man named Daniel Clark swindled some tradesmen of some goods and disappeared. Clues were found in A.'s garden, but he was acquitted of complicity owing to lack of evidence. He then travelled and gained a great store of learning, soon to be embodied in a *Comparative Lexicon of the English, Latin, Greek, Hebrew, and Celtic Languages*. A discovery of a skeleton caused his arrest and trial. He conducted his own defence, but unsuccessfully, and he was proved circumstantially guilty.

Aramæan, *see* Aram.

Aran, Islands of, or S. Aran, are a group of is. situated in Galway Bay, on W. coast of Ireland. They form a natural breakwater. In order from the N. their names are Inishmore (Great Is.), Inishmaan (Middle Is.), Inisheer (Eastern Is.). They contain architectural remains of early origin, among which are the ruins of the abbey of Killenda. For a time it was a famous seat of religion and learning. Its chief industry is fishing. The total pop. 1625. Another island of the same name is situated off the county of Donegal.

Aranda, Emmanuel, a traveller who was *b.* at Bruges. The exact date of his birth is not known, but it was at the commencement of the seventeenth century, and he *d.* after 1675. He was a prisoner for two years in Algiers, and on his return to Flanders he wrote a work on the condition of the slaves in Algeria.

Aranda, José Jimenez, *b.* in 1837 at Seville, was a Sp. painter. He received a gold medal from the Paris Exhibition of 1889.

Aranda, Pedro Pablo Abarca de Bolea, Count (1719–98), a Sp. minister and general, *b.* at Siétamo in Aragon. He was educated partly at Bologna, partly at the military school at Parma. In 1740 he entered the army as captain in a regiment of the 'Castilles.' On the death of his father, who was the colonel, he succeeded him, and took part in the War of the Austrian Succession. In 1749 he married Doña Ana, and had one son, who *d.* early, and one daughter. He copied Frederick the Great in his methods of military discipline. A short temper made it difficult for him to accustom himself to the weaknesses and characteristics of his fellow-workers, and this proved a source of constant irritation. In 1766 he was the most important minister in Spain. He *d.* at Epila, after his fall, due largely to his attitude of sympathy with the French Revolution.

Arang, a tn. in Raipur, India, once a large city with many temples. The Bageshwara temple is a pil[illegible] shrine. Pop. c. 7000.

Aranjuez, a tn. of Central Spain [illegible] the prov. of Madrid and situated [illegible] the l. b. of the Tagus. It is a [illegible] of the main S. railways to Ma[illegible] with a pop. of 12,000. The [illegible] plain around it gives the [illegible] vegetation the appearance [illegible] oasis, which fertility it owes [illegible] presence of a rapid of the Ta[illegible] prin. industry is farming [illegible]

rearing of horses and mules. It was once the seat of the Sp. court.

Arany, Janos (1817–82), after Petöfi the greatest Hungarian poet. He was *b.* at *Nagy-Szalonta, of a* Calvinist family. In spite of the hampering influence of his home he very early manifested promise of extraordinary talents. Intended by his father for the church, he disappointed him and [illegible] players. [illegible] fell upon his parents, and he returned, having secured a post at home as corrector. In 1840 he was appointed a notary, and married. His first work is a satire called the *Lost Constitution*, and was *of a political kind*. He became famous by winning two prizes from the Kisfaludy Society. During his residence at Nagy-Koros he produced a quantity of poems in Mogyar. His works include *Something about Assonance*, a translation of Shakespeare; *Death of Buda*, a prize poem; *The Love of Toldi* and *Toldi's Evening*, an epic.

Arapahoes, an Algonquin tribe of N. American Indians, who formerly lived in the dist. between the S. Fork of Platte R. and the head-waters of the Arkansas. Later they withdrew into Colorado. They now number about 2000, and have split up into three divs.; the Hitunena, in a reservation in Montana; the Northern A., in a reservation in Wyoming; and the Southern A., in Oklahoma, who sold their reservation in 1892, and are now citizens. They are tall and well-formed, a[illegible]ly, intelligen[illegible] ro-ber's *The* [illegible]

Arapai[illegible]e), a genus o[illegible] *of* the family o[illegible] the salmon [illegible] the largest [illegible] world, attaining [illegible] ft. in length. It is captured by spearing in S. America for exportation.

Arapiles, a Sp. vil. near Salamanca, celebrated as the site of the battle of Salamanca, in which Wellington defeated the Fr., 1812.

Ararat, a municipal tn. of Victoria, Australia. Its pop. is about 5000, and it is situated towards the W. [illegible] Dividing [illegible] the trade in [illegible]

Ararat, the highest point of Armenia, It rises to a level of 17,000 ft. It is situated in the plain of Aras. The mt. mass of A., rising from the Armenian plateau, consists of two portions, the Great and Little Ararat. Tradition ascribes to it the resting-place of Noah's Ark. The mt. is of volcanic composition, though no recent outbreak has occurred. The name also applies to the country of Urardhas, the country where the ark rested after the flood. The name is unknown to Armenians of the present day.

Aras, *or the* Araxes of Xenophon, a riv. rising S. of Erzerum and flowing through the Erzerum prov. into the Pisan plateau. It has a length of 600 m. Its trib. is the Zanga. From 180 B.C. *to* A.D. *50* Aratanata was the cap. of Armenia and stood on an is. in the Aras.

Arasur *Hills*, Bombay, famous for the shrine of Amha Bhawani. Mother Amha was one of the gods apparently of the pre-Hindu race taken over by the Hindus.

Aratch, tn. of Asia Minor, in vilayet of Kastamuni. Pop about 12,000.

Aratus (271–215 B.C.), a Gk. statesman. *b.* at Sicyon. He was educated at Argo. Abantidas the Tyrant put his father to death while A. was yet young. In 251 B.C. he overthrew Abantidas and commenced a very successful career. By joining the Achæan league he made it a great power against all tyrants. He eventually lost favour and was poisoned.

Aratus (315–245 B.C.), a Gk. poet contemporary with Theocritus. While residing with the Count of Antigonus he wrote his celebrated *Appearances of Phenomena*. He *d.* in Macedonia. St. Paul quotes from his works.

Araucanians, or Anca, the Indian natives of Arauco in Chili. The prov. lies between the Andes and the Pacific Ocean. The characteristics of the people are ferocity and a spirit of war, but they are unique as the only Indian people with a system of democratic government. No actual [illegible]line [illegible]eans [illegible]tive, [illegible]s, of [illegible] the [illegible]hief [illegible]hey [illegible]ing, but acknowledge the existence also of many spirits, both good and bad. They number about 50,000. In 1861, a Fr. adventurer called Tounens made an attempt to secure the crown and title of king of Araucania, but his attempts were not taken seriously, and he was returned to France as a madman. The A. vigorously resisted the Sp. occupation, and made desperate but futile opposition.

Araucaria, a genus of gigantic firs (Coniferæ) found scattered over the S. hemisphere. Its leaves are stiff and broad; the scales of the cones bear a leafy appendage and the anthers are many-celled. *A. excelsa*, the Norfolk Is. pine, abounds in turpentine, and *provides a* heavy timber; *A. Bid-*

willi, the Bunya-Bunya pine, grows in Australia: *A. imbricata*, the monkey-puzzle, yields much resin.

Arauco, a maritime prov. of N. Chili. Its area is 2458 sq. m. and its pop. 60,233. Its nature is agric. and its capital Lebu.

Araujo, Porto Alegre, Manoel de (1806–79), was *b.* at Rio Pardo, Rio Grande du Sul, Brazil. He was a Brazilian poet, painter, and architect, and is the author of collected poems called *Brazilianas*. He died at Lisbon.

Araujo e Azevedo, Antonio, Count de Barca (1754–1817), Portuguese statesman, *b.* at Ponte de Lima. Ambassador at The Hague 1789, at Paris 1797, at St. Petersburg 1802. In 1803 he became minister of foreign affairs at Lisbon, but when Napoleon entered Lisbon in 1807 he retired to Brazil, where he was made minister of marine in 1814, Count de Barca in 1815, and later Brazilian minister of foreign affairs. Died in Rio de Janeiro. He was interested in literature and science; wrote two tragedies, and translated some Eng. poems into Portuguese. See *Life* by Mendo Trigoso.

Arauré, a tn. of Venezuela, S. America, situated in a fertile dist. producing cattle, cotton, and coffee. Pop. about 4000.

Aravalli Hills, a range of mts. in India running through Rajputana and Ajmere-Merwara. Its highest point is Mt. Abu (5653). The white appearance of the range is due to large quantities of quartz and not snow.

Araxas, tn. of Minas-Geraes, Brazil, on the Rio das Velhas. W. of the Matto Gordo Mountains.

Araxes, the name of sev. rivs.: (1) In Armenia, the modern Aras (*q.v.*). (2) In Persia, which flowed into Lake Salsus not far below Persepolis, which tn. stood on its banks. (3) The A. or Chaboras in Mesopotamia, which flowed into the Euphrates. (4) The A. of Herodotus. *See* Herodotus, i. 20.

Arbaces, a Sardanapalus general, and king of Assyria. He founded the Median empire about 830 B.C. This is according to the very doubtful history by Ctesias. However, there are inscriptions of Sargon of Assyria, where mention is made of one Arbaku, a chief.

Arbalest, or Arblast (Lat. *arcuballista*, from *arcus*, a bow, and βάλλω, to cast or shoot), a cross-bow consisting of a wooden, iron, or steel bow, set in a shaft of wood, which with a string and a trigger served to throw bullets, darts, and arrows. The arrows used for the cross-bow were called 'quarrels.' It was no doubt derived from the larger 'ballistæ,' and was introduced into England by the Normans, and was used until the thirteenth century.

Arbe, an is. in the Adriatic. It forms the most northerly point of Dalmatia, Austria. Its pop. in 1900 was 4411. It is 13 m. long and 5 broad, and has A. for its cap. The ruins of the bp. of Marc Antonio de Dominis, the celebrated philosopher, are there. The principal industries are fishing and silk.

Arbela, an anct. tn. of Adiabeve. During Assyrian times it was the cap. of the country between the greater and lesser Zaab. The modern tn. is populated mainly by Kurds.

Arber, Edward (1836–1912), Eng. scholar, D.Litt. (Oxon.), F.S.A., Fellow of King's College, London, formerly Eng. examiner at London and Victoria (Manchester) universities, Emeritus professor of English at Birmingham University from 1894. He issued and edited many valuable series of reprints, including *English Reprints*, 1868–71; *English Scholar's Library*, 1878–81; *First Printed English New Testament*, 1871; *The First Three English Books on America*, 1885; *English Garner*, 1880–83; *British Anthologies*, 1899–1901; *The Term Catalogues*, 1903; *A Christian Library*, 1907. He was knocked down and killed by a taxicab in Kensington, Nov. 23, 1921.

Arbitrage, a commercial term applied to the process of the equalisation of prices in different business centres by buying in in the cheaper market and selling out in the dearer. It is mainly carried on between London, other European caps., and New York, and deals for the most part with stocks and shares, foreign exchange and bullion. The profits of A. are small except in stocks, in which case the operation is attended with considerable risk.

Arbitration (Lat. *arbitrari*, to judge), a term which has come to us from Rom. law, and which is applied to a judgment given by a selected person or persons in some disputed affair. In Rom. law we find in existence two forms of A., one compulsory and the other purely voluntary. As is the case in Eng. law, the arbitrators must come to a decision on all points submitted to them. A. as a method of judgment may be said to apply roughly to three different sets of circumstances: in civil law, in international law, and in the settlement of labour disputes.

The mode of proceeding to A. is by 'a submission' or '*reference*' to 'arbitrators' or '*referees*' who then proceed with due consideration of 'equity' to give their 'award.' This manner of the settlements of disputes

has been supported and encouraged in England for some very considerable time, and many Acts of the last century provided for the use of A. in many cases of dispute which would otherwise have come under the jurisdiction of the civil courts. Almost all civil cases can be submitted to A., and seldom when an award has been given by A. has it on some technical point been set aside. Breach of contract, breach of promise cases, property disputes, slander actions, trespass actions can all be submitted to A. In 1889 the A. laws of England, so far as procedure is concerned, can be said to have been practically codified. A matter which is obviously illegal and contrary to the public weal cannot be referred to A., since it is obvious that from motives of public policy and safety such matters must be punished for the public good. Any one who is capable of making a contract may be said roughly to be capable of making a reference to A., and, on the other hand, persons incapable of making a contract cannot make reference to A. It has also been held that reference to A. made by a lawyer for his client must stand good. In the choice of an arbitrator the parties at difference are absolutely free, they may choose practically whomsoever they will, and, provided that the person chosen is not incapable of making sane judgments, the choice will be upheld by law. It is customary, however, to choose as an arbitrator a person capable by training of examining evidence, or a person who is familiar with the subject under A., *e.g.* in naval matters a seafaring arbitrator would usually be chosen. In most ordinary cases of A., however, a lawyer is usually chosen. All these rules apply to voluntary A. A court or judge, however, may put any point arising in any case to compulsory A., when the award of the arbitrators may be enforced as the judgment of the court.

Arbitration Act of 1930.—This Act is a corollary to the Arbitration Act of 1889, in that it carries further the constantly increasing desire of Parliament to aid and encourage private A. Its enactment resulted from the requirements of international trade and it was passed in consequence of resolutions discussed under the auspices of the League of Nations. It was in 1923 that the League Assembly promulgated a 'Protocol on Arbitration Clauses,' recognising submissions to A., and effect was given to that protocol by the British Gov. in the Arbitration Clauses (Protocol) Act, 1924. The next step in the raising of the status of private As. was the Geneva 'Convention o Execution of Foreign Ar Awards,' which the British accepted in 1927. The Act of was passed to give effect to convention. The vital provisio the Act is the second section, w declares that a foreign award ma enforced in England either by ordinary action at law, or, a judgment or order, under the Ac 1889, thus placing foreign awards as sure a foundation as E awards, so far as recognition and forcement by Eng. courts are c cerned. But the aid of our courts c be invoked only if one at least of t parties concerned is a subject of Power which has made reciproc provisions to enforce foreign award as declared by Order in Council, or the award was given in a territory *e.g.* a colony or protectorate, whic has received similar recognition b Order in Council.

International A.—An act by which two nations agree to submit their differences to one or more persons, and to agree to their award after both the parties at difference have had an opportunity of being heard. If the arbitrator is an emperor, a king, or president of a republic he is not expected to act in person, but to delegate his authority to a chosen board of arbitrators. Further, the award of a board of arbitrators is not enforceable, as is the award of an enforced A. at civil law, but rests entirely upon the faith and honour of the parties submitting their case to A. It is usual also to appoint an odd number of arbitrators, and to abide by the decision of the majority in case an unanimous agreement is not arrived at.

International A. has to deal not only with questions of law, but also with questions of fact. Usually, however, when a point of law has to be decided, the case is referred to a court of A., which gives an 'award' as in the case of civil law. But frequently cases of frontier questions and pecuniary liability have to be decided, and in that case a 'mixed commission' usually hears the case, *i.e.* a commission composed of representatives from both or all sides. In recent times international A. has been used to a very large extent by many nations. Great Britain heads the list as having figured in the greatest number of cases, being followed by the U.S.A. and France. The subjects which have been chiefly in dispute may be roughly summed up into differences over the ownership of land or of fishing rights, and pecuniary losses caused by the wrong action of another State. Among the most important cases submitted to A. in the

earlier years were the Alabama case, the Behring sea-fishery case and the long-drawn out case of the fishing rights of the Fr. off the coast of Newfoundland, which was settled in 1904, and which had dragged its slow length along since 1711. A permanent court was estab. at The Hague in 1900 to which many important cases have been referred. The Hague Court of A. was the realisation of an old ideal dating back to the eighteenth century, and was the immediate outcome of a peace conference called by the Tsar of Russia in 1899. Sixteen of the powers agreed to the appointment of a court which should be open for the settlement of all disputes amongst nations. The court was to be composed of men learned in international law and appointed by the signatory powers. The aim of the court was obviously the furtherance of the peace movement by the submission to this permanent court of all disputes from which war might arise. Probably its most important decision was given in the case of Great Britain, Germany and Italy *versus* Venezuela. On that occasion it probably prevented war, and certainly allayed the spirit of hostility which had arisen from the Venezuelan question.

A. between Great Britain and the U.S.A.—It is to be observed that long before there was any world Court of Justice or a Hague Court, Great Britain and the U.S.A. were distinguished among all the nations for their readiness to submit differences to A. rather than resort to arms. One of the most famous cases between the two nations was that known as the Alabama case. (*See under* ALABAMA, THE.) The most serious difference between America and Great Britain in modern times occurred during the second administration of President Cleveland. There was a dispute between Venezuela and Great Britain over the boundary between Venezuela and British Guiana. Secretary of State, Richard Olney of the U.S.A., intervened in a dispatch to the British Gov. which brought relations between the two countries almost to the breaking point. The crisis was allayed by the judicious policy of Lord Salisbury, then British Prime Minister, and the matter was submitted to A. and settled some years later. Other prominent cases in which the U.S.A. and Great Britain were involved and which were settled by A. were the boundary dispute between Alaska and Canada in 1903; and the N. Atlantic coast fisheries dispute which was settled in 1910 after causing difficulty for over sixty years. Not only did the two countries thus set an example to the world, but they emphasised it by signing a treaty of A. Aug. 3, 1911, and again on Sept. 15, 1914, when they signed an Anglo-American Peace Commission Treaty. In so far as human promises can avail, the two great English-speaking nations have thus abjured all thought of war between them and have solemnly decided that any and all disputes between them shall be settled by peaceful A.

A. and the Great War.—It affords food for melancholy reflection that A., the solvent of international differences of no insignificant character, such as the Venezuelan Boundary Question, should have played next to no part in the Great War. Its voice was not, however, altogether silent, though sometimes the voice was hypocritical. Three successive Ger. Chancellors, Bethmann-Hollweg, Michaeles, and Hertling, were constantly advertising their desire for a peace by negotiation and bemoaning the Allies' lust of conquest. The year 1917 was favourable to such 'defeatist' policy. Terrible battles —Arras, Verdun, and Ypres—had yielded nothing definite to the Allies in exchange for the great carnage. The moment was propitious, from the Ger. point of view, for encouraging a movement in the Allied countries for a 'negotiated peace' as opposed to a 'peace through victory.' Behind this movement were many and diverse elements of no negligible character—the international financiers, who, rightly or wrongly, feared that credit all round would founder in the chaos of Socialism—the Socialist groups, the pacifists, certain ecclesiastics, and some of the old diplomatists. The movement took shape in a proposal for a conference at Stockholm; but the Conference proved a complete failure (*see* STOCKHOLM CONFERENCE). In the same year, too, the Catholic Church put forward a special plea for peace in which Pope Benedict XV, in outlining in his Note (Aug. 1, 1917) his ideas of the bases calculated to ensure an enduring peace, proposed *inter alia* the 'settlement of all international disputes by A.' (*see* BENEDICT XV, POPE). The Central Empires loudly supported this substitution of the 'moral power of right' for material force, but said nothing of the restoration of conquered territory. The Allies left President Wilson to reply, in his characteristic vein, that the action of the existing Ger. Government rendered nugatory any negotiations with them.

The moral to be drawn from this and similar failures is not that A. is

necessarily a hopeless expedient, but merely that its voice is unlikely to be of any avail after hostilities have begun. The foundations of international relationships must be reconstructed if A. is to prove a more effective preventive of war than hitherto. In the Covenant (*q.v.*) of the League of Nations, a laudable effort, largely inspired by President Wilson, is made to strengthen A. as a means of composing international differences. The members of the League agree that 'if there should arise between them any dispute likely to lead to a rupture' they will submit the matter either to A. or to inquiry by the Council of the League, and that they will in no case resort to war until three months after the award of the arbitrators on the Council's report. An award must be made within a reasonable time and a report by the Council within six months of submission. The League members also agree that whenever any dispute arises between them 'which they recognise to be suitable to A. and which cannot be satisfactorily settled by diplomacy,' they will submit the whole subject-matter to A. Disputes as to treaty interpretation, any question of international law or as to the existence of any fact which if proved would constitute a breach of international obligation or as to the reparation for any such breach, are declared to be matters generally suitable for submission to A. The Court of Arbitration to which the case is referred will be the Court agreed on by the disputants or stipulated in any convention existing between them. Finally, the members agree that they will carry out in good faith any award made, and will not resort to war gainst a member which complies with he award; and in the event of any ilure to carry out an award, the ouncil will propose what steps should taken to give effect to it. This venant is now over ten years old, t however admirably conceived d laudable in intent, its record achievements affords as yet no icient guarantee of eventual mph. The Græco-Turkish War 22), and the refusals of Signor solini to allow the League to fere in any questions touching Adriatic or the Adige, seem to ate that in any really serious ngency the League's A. machi- is inoperative. But time and rce of international opinion may the League ideals nearer to n.

tration since 1922.—Since the shment of the Permanent of International Justice in he advance which took place in regard to A. in the ensuing five y was seen in three directions: in actual work of the Permanent Cou in the number of special Arbitrat Treaties concluded by individ Governments; and, finally, in general trend of the debates in t plenary sessions of the Eighth A sembly of the League of Natio The Court's intervention in a dispu between two or more govs. may b secured either for the interpretatio of treaties, where specific provisio for such reference to the Court has been made in advance by the parties; or for the settlement of all justiciable disputes referred to it by both parties; or by one party only if both have accepted the Optional Clause of the Statute of the Court (*see* OPTIONAL CLAUSE); or for an 'advisory opinion' upon any dispute referred to it by the Council or Assembly. 'Opinions' have been given on a dispute between France and Great Britain as to the nationality (and consequently liability to military service) of British subjects in the French protectorate of Tunis; in disputes between Poland and Germany in 1923, as to the nationality and the rights of German residents in districts ceded to Poland under the Treaty of Versailles; and in the interpretation of the Treaty of Lausanne (*q.v.*) regarding the sovereignty of the district of Mosul—a most important question (*see* IRAQ). The Court's jurisdiction has also been invoked in other ways, *e.g.* in the case of the *Wimbledon*, which raised certain questions of interpretation of the Transport Clauses of the Treaty of Versailles arising out of the closure by Germany of the Kiel Canal to a British vessel chartered by a Fr. firm to carry munitions to help Poland against Russia. An instance of a case of reference by the consent of both parties or by one party relying on the Optional Clause is afforded by the agreement in 1924 by Greece and Bulgaria to invite the Court's interpretation of the Treaty of Neuilly relative to a frontier dispute; and in the same year Belgium invited the 'compulsory' jurisdiction of the Court against China in the matter of the *Denunciation of the Sino-Belgian Treaty of* 1865, relying on the 'Optional Clause,' which both had accepted; and also by the *Lotus* case, submitted by France and Turkey in 1926, an important case raising a pure question of customary international law arising out of a collision between a Fr. and a Turkish vessel with resultant loss of life. The readiness of both France and Turkey to submit so important a decision to the Court is an indication of increasing confidence in that tribunal and the

great increase in the number of A. Treaties—at least ninety were negotiated between the end of the War and 1926, a number much larger than all the treaties concluded during the nineteenth century—is another tribute. Thus far the progress of A. was good, but when the sessions of the Eighth Assembly of the League began, it was appreciated that the leading govs. of Europe were not prepared to pledge themselves further in regard to A. until more substantial advances had been made in the sphere of security, while the British Gov. showed so little sign of changing its attitude towards the 'Optional Clause' that the Imperial Conference of that year declared the time premature to accept the obligations of that famous Clause. But at least it was clear in the course of the Eighth Assembly's sessions that the Powers great and small were much more disposed to take a generous step in the direction of compulsory A. for all justiciable disputes than had before seemed possible. (*See further* ARMAMENTS, LIMITATION OF.)

Consult *From Paris to Locarno and After*; by Fred Alexander (Dent, 1928).

Industrial Arbitration.—The term . is also frequently used in a sense hich differs from that of civil or ternational A., *i.e.* A. in labour sputes. This A. usually takes place tween representatives of the emyers and of the employed, although quently an independent arbitrator ppointed. The whole position of in its labour sense was a purely ntary one until the year 1896, n legislation was passed placing on a legal footing. Previous his, however, A. and A. boards been estab. in almost every trade e country.

e Conciliation Act of 1896 red all previous legislation, and, orted by the fact that a coal dis had been settled by Lord ery in 1893 and a cab drivers' e by the home secretary in stated that in cases of dispute en employer and employed gs might be held with an inent chairman, or a chairman ted, on application, by the of Trade. In 1907, by the on of conciliation boards by ident of the Board of Trade yd George), a railway strike roke out in 1910 was tem averted. In 1912 compulsory ion boards were set up by the ion Bill which helped to end strike of that year. These ere to have independent elected by a given date, ich they were appointed by the gov., or they could, on application, be appointed straight away by the Board of Trade. These conciliation boards were to fix the wages which had been in dispute during the coal strike. In the U.S.A. about thirty states have made constitutional or statutory provision for mediation in trade disputes. Federal legislation may not touch the question of A. and conciliation save as regards disputes affecting inter-state commerce.

Industrial Arbitration since the Great War.—The Conciliation Act of 1896 combined with the Industrial Courts Act, 1919, represents the characteristic British form of the system of settlement of industrial disputes by conciliation and arbitration; with its emphasis on voluntary or optional resort to investigation, conciliation and arbitration by competent tribunals. Voluntary recourse to these methods, with or without encouragement or assistance from the Gov., has now been a long-established practice in all the well-organised British industries; while Trade Boards supply the need in the less well-organised and unorganised industries. In some British Dominions, however, the principle of Compulsory A. has been adopted, and the legislation of most of the Australian States has been modelled upon it. Italy, too, under the stern government of Mussolini, has adopted a compulsory A. law which absolutely forbids stoppages of work. The tendency towards compulsion is not otherwise very pronounced. In the Great War Compulsory A. was adopted by the Munitions of War Acts, 1915–17, which provided for settlement of wage disputes by a committee of production, a Court of A., or a single arbitrator. This system was continued for a time after the war by the Interim Wages Act, but in 1919 compulsion in the U.K. was abolished by the Industrial Courts Act which established a Standing Industrial Court of independent persons and representatives of employers and workpeople, to deal with such disputes as might be referred to it, with the consent of both parties, or to investigate the circumstances surrounding a dispute if the Minister of Labour, with or without the consent of the parties, deemed inquiry to be desirable. In its original form this measure contemplated compulsory A., and went so far as to make trade union funds liable for strikes against the decisions of the arbitrators, but in its accepted form neither the awards of the Court nor the findings of an Inquiry are made binding upon the parties. Thus the tradition of voluntary resort to A. is perpetuated, the only significant departure being the

extension of the power to order an inquiry into the circumstances of a dispute at the Minister's discretion. The Act lies on the border line between A. and conciliation in that it partakes of the nature of both. But the statutory power given to the Minister of Labour with respect to investigation is not adequate in that it is left entirely to his discretion to order an inquiry, and gives the Court no power to compel production of documents and witnesses. Elsewhere, important changes in the machinery of conciliation and A. have been introduced by all the larger countries of the world in the last few years. All must appreciate the loss to the community through the number of working days spent in idleness. Recurrent stoppage on an ever bigger scale as, *e.g.*, in England in 1926 suggests the necessity of overhauling the existing machinery in the hope of evolving a more reliable system.

In some countries, the arbitral body itself exercises the initiative, *e.g.* in Canada, under the Industrial Conditions Act, 1919, of Manitoba, a joint council of industry was set up of five persons, two each representing employers and employees, with an impartial chairman, with the assistance of technical advisers appointed by the Lieutenant-Governor. This body can take the initiative in investigation of conditions affecting wages, including cases of alleged unfair profits through low wages, cost-of-living inquiries and so forth.

While experience on the whole seems to strengthen the traditional British method of voluntary conciliation and A., it also tends to confirm the view that in some authority should be vested the power ultimately to compel inquiry and that the investigating tribunal should be of such a character as would guarantee its permanence and the continuity of its operations. These at all events are inferences which suggest themselves by the light of the settlements of trade disputes in Australia in late years. But, in the U.K., any progress that might have been made has been prejudiced by the General Strike of 1926, the rancour of which led to a reform in another direction altogether, here being ground for supposing hat the free will of the workpeople as not consulted before their leaders urled them into the vortex of a strike See TRADES DISPUTES ACT).

Arblast, *see* ARBALEST.

Arboga, a tn. in the län of Wes- ras, Sweden, situated on the riv. and canal which connect Lakes elmar and Mälar. Once important the seat of many councils and diets.

Arbogast, a barbarian officer of the Rom. army at the end of the fou century. His nationality is obscu but the authorities, among th being Zosimus and Sulpicius Ale ander, give it as Frank. He serv with distinction against the Goth and was sent against Maximus, who he totally defeated in 388 A.D. then became the chief minister Valentinian II. The death of Valen tinian, who had opposed barbaria progress, led A. to select as a suc cessor one Eugenius, a rhetorician A battle against Theodosius saw A.' defeat. He escaped, however, while Eugenius was executed.

Arbois, a tn. of E. France in the dept. of Jura in Cuisance. Produces good red and white wine and possesses a tannery, saw-mills, and paper and oil industries. Pop. 3475.

Arbois de Jubainville (1827–1910), a Fr. historian and philologist. In 1851 he acquired the degree of palæographic archivist and was appointed to the archives of Aube, remaining in that office till 1880, receiving a pension. In 1882 he was appointed to the newly formed chair of Celtic at the Collège de France, and began his *Cours de littérature celtique*. He was among the pioneers who brought to the study of Celtic literature sound erudition without the harmful prejudices which long retarded Celtic scholarship.

Arbon, a Swiss tn. in the canton of Thurgau, situated on Lake Constance. Pop. about 3000.

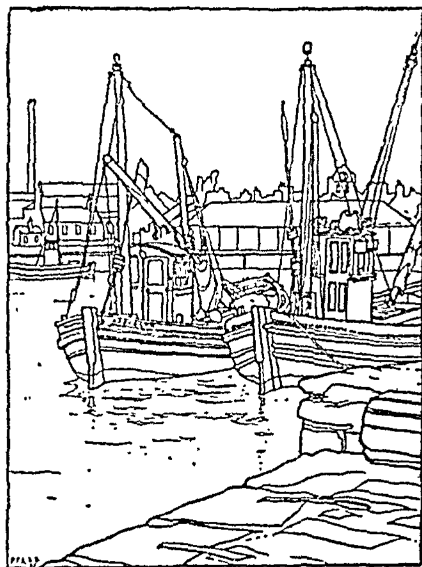
Arbor Day is a day set apart for the public planting of trees in America. The custom originated at Nebraska in 1872 and gradually spread throughout the continent. With few exceptions it is regarded as a legal and public holiday. The date is movable and fixed by proclamation. The same custom is observed in New Zealand.

Arboriculture (Lat. *arbor*, tree, *cultura*, cultivation), the scientific cultivation of trees, whether ornamental or useful. In the cultivation of fruit trees such processes as grafting, pruning, and binding are employed; viticulture, or vine-growing, is common to France and S. Europe. For sylviculture, or the growing of forest trees for timber, *see* FORESTRY.

Arbor Vitae (Lat., tree of life), a Chinese and an American species of *Thuja* of the order Coniferæ. *T. orientalis* is the name of the former, *T. occidentalis* of the latter. The leaves are small and wrap round the stem closely.

Arbroath, or Aberbrothock, a seaport of Forfarshire, Scotland. It is situated upon the mouth of Brothock Water. It is under the administration of a provost, assisted by bailies and

a council. Its chief industries are the manufacture of sail-cloths, canvas, the tanning of leather, boots, bleaching, engineering, chemicals, and extensive fisheries. Pop. 19,496.



ARBROATH

Arbroath Flags are grey flagstones and grey and olive shales found almost exclusively in Forfarshire.

Arbues, Pedro (1441–85), Sp. inquisitor, *b.* at Epila, was a member of the Augustinian College at Saragossa, and in 1484 was appointed first inquisitor there by Torquemada. He was zealous in his persecutions, and was finally assassinated by friends of his victims. He was canonised in 1861 and again in 1867. *See* his *Life* by Zirngiebel (3rd ed. 1872).

Arbuthnot, Alexander (1538–83), a Scottish ecclesiastic and poet. He was educated at St. Andrews and later at Bourges. In 1569 he was installed principal of King's College, Aberdeen. This post he filled till his death. His existing works are: *Praises of Women; On Love; Miseries of a Poor Scholar.*

Arbuthnot, Charles (1767–1856), a diplomatist and politician. In 1795 was elected member for E. Looe. At Constantinople as ambas. he won distinction. He was a personal friend of the Duke of Wellington.

Arbuthnot, John (1677–1735), British physician and author, *b.* at Arbuthnot, Kincardineshire. His father was an episcopalian minister. On the death of his father, John entered the house of a London draper, William Pate, where he taught mathematics. In 1692 he produced the *Laws of Chance.* In 1704 he was elected a Fellow of the Royal Society, and in 1705 was appointed physician extraordinary to Queen Anne. Among his friends were Swift and Pope.

Arbutus, a genus of evergreen shrubs of the order Ericaceæ, occurring in Europe, the East, and N. America. *A. unedo,* the strawberry-tree, mentioned by Virgil, bears a berry which resembles the strawberry. *A. andrachne* is the Oriental arbutus.

Arc (from Lat. *arcus,* a bow), a portion of a curved line. The straight line joining its extremities is called the 'chord.' The length of an A. of a circle can be determined if the angle subtending the A. at the centre and the radius or circumference are known. If r is the radius, the circumference $=2\pi r$, where $\pi=3{\cdot}1416$. Then if a be the angle subtending the A., the length of the A. is $\frac{a}{360}$ of the circumference.

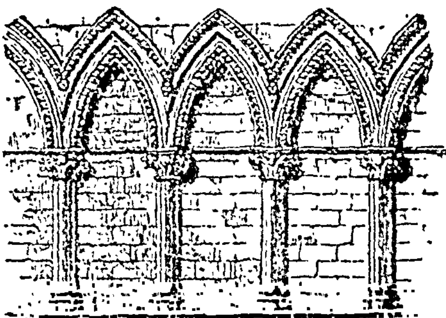
The electric A. is the electric discharge between two carbon terminals at different potentials. It is utilised for lighting purposes in A. lamps, and for soldering and fusing purposes where an extremely high temp. is required.

Arc, Joan of, *see* JOAN OF ARC.

Arca, an anct. tn. of Phœnicia which contained the temple of Aphrodite Astarte. It was the bp. of Alexander Severus, from whom it took the name of 'Cæsarea Libani.'

Arcachon, a coastal tn. of S.W. France in the dept. of Gironde; is celebrated for the magnificent pine woods in the vicinity. There are two divs. of the tn., the summer part on the beach, and the winter portion inland. The climate is very mild, and many consumptives use it as a winter resort. The chief industries are oyster-breeding and fishing. Pop. 10,266.

Arcade, a range of arches supported either by piers or columns. The



ARCADE

earliest known examples are those of Tabularium, the theatre of Marcellas, and the Colosseum at Rome. In some a gallery runs behind the supporting pillars, in others they are part of the wall. The latter are called 'blind' or 'wall' As. and are common in Eng. churches.

Arcadelt, Jacob (1514–75), a Netherlands composer of music. In 1539 he taught the choristers of St. Peter's, Rome, and later in 1540 he became a papal singer. He composed large quantities of church music. In 1555 he left Italy and entered the service of the Duke of Guise, producing volumes of masses.

Arcadia, the central plateau of Peloponnesus, Greece. It is surrounded by mountain barriers, and suffered stagnation on account of the difficulty of establishing communication with surrounding countries. The anct. inhab. were shepherds and hunters whose gods were Pan, Hermes, and Artemis. It played a fairly important part in Gk. history, as it is placed between Sparta and the isthmus. A popular idea of the mode of Arcadian life attributes to them perfect happiness evinced by the absence of all that is called mundane in modern cities. Simple diet and an absolute ignorance of immorality aid this idyllic conception of the Arcadians.

Arcadius (378–408), Rom. emperor and son of Theodosius the Great. He succeeded his father at the same time as his brother, and the kingdom was divided between them. Both displayed small governing ability, and it speedily passed to other hands. The ...en E. provs. of the Orient and ...llyricum came to A. Influenced by ...is mother and various successful ...ounsellors, A. vacillated to and fro. ...e was succeeded by his son Theo...osius II.

Arcadius, a Gk. grammarian of the ...cond century, a native of Antioch. ...e was the author of treatises on ...thography and syntax, and a ...cabulary by him has been stated to ... a remarkably valuable achieve...nt. An epitome of the works of ...rodian has been attributed to ..., but without authentic proof.

...rcani Disciplina, a theological ...n applied to the custom, which ...vailed in the early Christian ...rch, of regarding certain rites as ...nate mysteries, to be carefully ... from the heathen and even from ...e who were receiving instruction ...e faith. The term was not in use ...e seventeenth century, in which ... was written *de disciplina arcani* ...th the Catholic and Protestant ...s practice was based on Matt. vii. 6, 'Give not that which is holy unt... the dogs, neither cast ye your pear... before swine,' and on Cor. iii. 1, 2... The doctrines of the Holy Trinity, baptism, and the eucharist were especially withheld from the knowledge of the uninitiated. This practice of reserve prevailed about the third century, and was well estab. in the fourth and fifth. The writers who set forth the idea are Origen, Basil, Athanasius, Chrysostom, Theodoret, Ambrose, Augustine, and others. Many early writers refer to it, and veil their meaning so that only the initiated may understand. The creed was only formerly delivered to the catechumen at his baptism, and was, therefore, regarded as a mystery. The Lord's Prayer, likewise, was jealously kept from the heathen, because of its prominence in the communion office. The reason given for this secrecy was that all converts were not sincere, and that the early church was obliged to be jealous of her doctrines for fear of the misinterpretation and persecution to which she was subjected.

Arcanum is the neuter of the Lat. adjective *arcanus*, used as a substantive. It had the significance of a profound mystery, or, in a more particular sense, one of the alchemist's secrets of nature, such as the elixir of life, the philosopher's stone, etc. The plural form *arcana* is also used, sometimes as though it were a singular noun.

Arcanus Senilis, lit. the bow of old age. A narrow white or yellowish band which begins to appear first at the upper and then at the lower margin of the cornea and extends along the edge until these two arcs meet at the sides so as to form a complete ring. The change is due to fatty degeneration of the tissue, and usually begins to take place before the age of forty, the complete ring having been formed at the age of sixty or seventy, so that the term is not strictly correct.

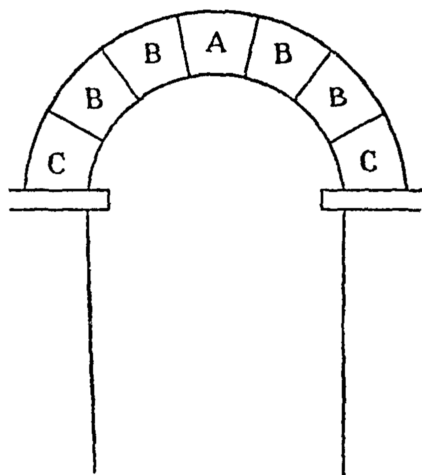
Arce, an It. com. in the prov. of Caserta; pop. 7500. The tn. of A. is near Arpino, and has a pop. of 2000.

Arcesilaus (316–241 B.C.), Gk. philosopher, and founder of the Middle Academy. He was *b.* at Pitaine in Æolis, and was educated by Autolycus, and later at Athens by Theophrastus and Crantor. He left no writings.

Arcevia, a tn. of Ancona, Italy, on the Marches, 29 m. S.W. of Ancona; pop. 15,000.

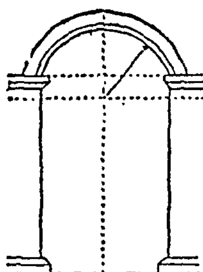
Arch, a structure of stones or other hard blocks arranged in curves over an open space, so that the individual blocks may be supported by their mutual pressure and thus be enabled to sustain a superincumbent load.

The sides of an A. are termed *haunches* or *flanks*, the blocks of which it is composed are called *voussoirs* (B). The lowest voussoirs

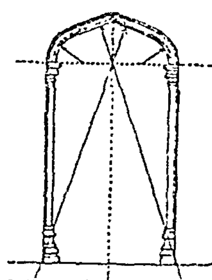


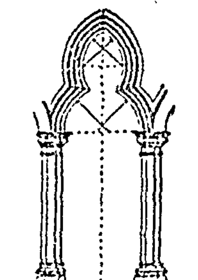
are called *springers* (C), and the highest is called the *keystone* (A). The inner curve is termed the *intrados*, and the outer curve the *extrados*.

In building an A. it is necessary that a temporary structure should be erected in the open space to serve as a support to the voussoirs until the keystone is put in place. Semicircular frames of timbering are generally used in modern building for this purpose.

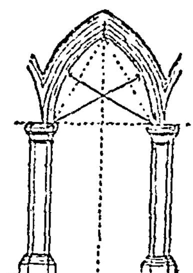

SEGMENTAL

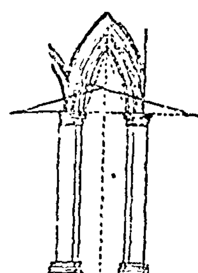
The A. was utilised by the anct. Assyrians and Egyptians, but was not generally employed by the Gks., who maintained the tradition of the straight line in their architecture. Rom. As. were usually semicircular, though segmental As., that is, where the centre of the curve is below the springers, were not uncommon. The pointed A. appears to have been adopted by the Mohammedans as an emblem of their faith, and it made its way into Europe through the example of their own building and the ideas brought westward by the returning crusaders. It was used in Gothic architecture in various forms, the simplest of which are the equilateral pointed A., where the centres are at the foot of the springers; the drop A., where the centres are within the archway; and the lancet A., where the centres are outside the archway. In the Fr. Flamboyant period the elliptical A. with three centres became common, as also did the ogee A., with


EQUILATERAL


LANCET

four centres, the upper curves being contra-flexed. The Tudor A. is a four-centre pointed A., and is the leading characteristic of the archi-


TUDOR


POINTED TREFOIL

tecture of Tudor mansions and churches in this country. Foliated As. imitated in their form the shapes of leaves, and are classified according to the number of foils, as trefoil, cinquefoil, and polyfoil.

Arch, Triumphal. In order fittingly to celebrate the victorious return of Rom. generals, an A. was erected either across roads or at the entrance to cities. The first known T. As. were those erected by L. Stertinius in 196 B.C. He erected two in the Circus Maximus and the Forum Boarium respectively. During the reigns of the Rom. emperors they received much attention, and lavish expenditure of money and every device of art was brought into play to add to their splendour. Frequently they were decorated with bas-relief designs and adorned with laudatory inscriptions. The total number of T. As. that were built by the emperors is about forty, of which number three remain standing. These were built respectively by Titus in A.D. 82, Septimus Severus in A.D. 203, and Constantine between the years

A.D. 306 and 337. Variations of these forms of masonry exist in other parts of the old Rom. empire. They are found at such places as Rimini, Susa, Verona, Ancona, Orange (France), and Capura (Spain).



ARCH OF CONSTANTINE

Inspired by a similar motive, Napoleon resolved to adorn Paris with four of these structures. In 1806 he caused to be erected the Arc de Triomphe du Carrousel. It is situated between the Louvre and the Tuileries, and has been constructed after the pattern of the A. erected by Septimus Severus. In the same year another A. was commenced beyond the Champs Elysées. This is the Arc de Triomphe de l'Etoile. Its erection, however, suffered some hindrance, and was not completed till thirty years after. In 1871 the Ger. army marched under it on their entrance into Paris. Modelled upon the style of the A. erected in Rome by Constantine was the Marble A. of London. Originally it was situated at Buckingham Palace, but in 1851 it was transferred to Hyde Park. George III. was responsible for the idea of its construction. The expense involved amounted to over £80,000.

Arch, Joseph (1826–1919), an Eng. politician and founder of the National Agricultural Labourers' Union. He was *b.* at Barford, Warwickshire. Justin M'Carthy calls him the 'emancipator of the agric. labourer.' He represented the N.W. div. of Norfolk in the parliaments of 1885 and 1886; and he was returned again in 1892 and 1895. He retired to Barford in 1900.

Archæan System (Gk. ἀρχαῖος, ancient), in geology, the lowest system of stratified rocks, below the Cambrian system. Other terms proposed are *Pre-Cambrian*; *Azoic* (without life), because it is believed that no fossils occur in it; and *Eozoic*, on the assumption that a structure called *Eozoön* is really a fossil. The A. S. is one of great complexity; it consists of a mixture of igneous rocks with stratified rocks, many of which have been metamorphosed. The most important constituents are gneisses and schists, whilst the presence of animal or vegetable life is indicated by masses of carbonaceous shales. The A. S. is understood to underlie the younger formations in every part of the globe, and it is estimated that in places it attains a thickness of from 80,000 to 100,000 ft. There are outcrops in the N.W. of Scotland; the Wrekin in Shropshire; over a great part of Canada; in Michigan and Minnesota in the U.S.A.; in Scandinavia, Brittany, Bavaria, and the Pyrenees in Europe; in Tasmania and New Zealand; in N. China and Japan; and probably over a great part of Canada. The rocks often yield minerals of great value, including iron, gold, silver, copper, nickel, and sometimes precious stones. *See* Sir A. Geikie, *Text-book of Geology*.

Archæology, the study of antiquities. The progress of knowledge has varied the nature of the application of the word to all anct. branches of study, as it was once only used to signify the study of the art of Greece and Rome. The range is extremely wide and covers vast ground, for it embraces practically the whole of the history of races and things from the beginning of history to the middle ages. So many fields of study are closely associated with A., *e.g.* geology, palæontology, pal[illegible] necessary to [illegible] it is between [illegible] line confine the term A. [illegible] subjects and to element found in remains anct. and mediæval.

A. may be said to have commenced with the end of the Quaternary period of geology. Controversy has been waged upon the question whether distinct evidences in flint and stone implements place the source farther back, into the Tertiary period. The main difficulty which seems to arise is that of discrimination between chips of rocks formed by Nature in the crumbling processes of earthquakes, denudation, etc., and actually artificially formed weapons. It is certain, however, that in order for man to possess the necessary skill exhibited in the Quaternary flint implements, he must have passed through a previous and necessarily less skilful stage. Evidences of this period have been claimed to exist in the Plateau-gravels of Kent, Belgium, and Egypt, and the term eolithic, meaning

'dawn-stone,' has been applied to them. To this question polemical discussion has been directed, and the main issue seems to rest upon the possibility of the chipped edge of flints having been caused by natural forces. Supporters of both ideas have strong contentions.

With the Palæolithic period evidence of a more dependable character is found. Corresponding characteristics in the flint remain, and the beds in which they are found point to the similarity of age of both the bed and the deposit, hence this evidence is almost purely geological. During the Tertiary period the contour of Europe was very different from that of the later Quaternary period. Practically all the area N. of a line drawn from S. England to Leningrad was sea, and the climate existing over the area was of a mild character. The great change came, with its enormous upheavals resulting in the appearance of the Alps, Carpathians, and Caucasus. The whole level was raised and the great mt. systems, with their capacity for condensing, caused the Pluvial period. Moreover, further phenomena which resulted were the appearance of glaciers, powerful agents of denudation and defacement, and increasing cold towards the N. Acting with these gigantic forces were the great riv. systems of Europe, and thus it is that we find such a depth of bed, worn to its extent by the erosive nature of its progress.

The earliest recorded palæolithic implement was probably found towards the end of the seventeenth century, and it supports the incontrovertible fact that the Thames has changed its bed for one now much narrower than the old.

The study of cave remains is comparatively new. It dates from the beginning of the eighteenth century. Previously, of course, explorations had been undertaken, but the motives responsible for them were of a nature more vulgarly inquisitive than an artistic desire to promote knowledge. Among the discoveries were probably fossil remains of Quaternary animals, whose chief value rested in their supernatural powers and their mythical associations. In the now-famous cave at Gailenreuth in Franconia many remains were found by the archæologist of mammoths and like extinct animals, but it was not until 1842 that the search for evidence of man's contemporariness with them was begun. The proof was found in Kent's Cavern, Torquay, by the Rev. J. McEnery. The peculiarity of the strata in this cave led experts to find that, fortunately enough, traces existed of man's occupation of the cave through all the varying periods as far even as the mediæval stages. Endeavours to fix the enormous intervals of time that must have lapsed between the different occupiers have varied in hundreds of thousands of years, sufficient evidence of the futility of the attempt. From the caves of France important discoveries have yielded specimens of primitive portrayal of animals upon stone and clay vessels that stand far above all contemporary evidences for remarkable skill in their intelligent execution. To gauge the quality of the intellect of the human mind at this period, it would assist to compare it with the Australian black or Fuegian. The best known of these engravings, that of a mammoth on ivory, is in the Jardin des Plantes, Paris. The attempt is extraordinary rich in cleverness of perception. While the line delineations of these cave-men possess such striking accuracy of touch, scarcely less true and faithful are their sculptured objects. That such a standard of art should exist within minds of such poor development comparatively, is a question which remains unsolved. The fact that the climate has been proved to have been more temperate does not, of course, establish any further reason for this artistic excellence. Among the difficulties which beset the students of A. are the numerous attempts at fraud which have been made from time to time. Many of the perpetrators have had the audacity not only to spend considerable care and time in the manuf. of false evidences, but have produced works on their 'discoveries' supporting their claims to scientific recognition.

The dangers of fraud in A. are perhaps best illustrated by the notorious Glozel case, an outline of which may be given here. Glozel is a hamlet S.E. of Vichy, the celebrated Fr. spa. On March 1, 1924, a M. Fradin, son of a local farmer, found the remains of a glass furnace of some past age. The news of this find reached the ears of a Dr. Morlet, in Vichy, and he appeared on the scene in April 1925. He and Fradin thereafter found buried many bricks engraved with what were apparently alphabetic signs in an unknown script, but which it was suggested antedated all known inscriptions by thousands of years. The alleged discovery roused tremendous interest in archæological and wider circles, and led to polemical discussions, of intense bitterness, in the scientific and general press, M. S. Reinarch leading for the 'pros,' and the Englishman, Mr. O. G. S. Crawford leading the critics. Finally the International Institute of Anthropology appointed, in Septem-

ber 1927, a committee of eight members to investigate. This committee visited the spot in November 1927, and reported, unanimously, that the antiquity of the finds was not proved to its satisfaction.

At the end of the Palæolithic period a break in the history of man in Europe occurs, and the next traces are those of the Stone age. The structure and form of the country he inhabits are those familiar to us at the present day. New accomplishments appear, among which are the use of animals for domestic purposes, agriculture, and pottery, besides the significant mastery of weaving. More questions arise here as to the disappearance of the palæolithic man before the advent of the race whom we will call Neolithic, and the same character of conviction on both supporters leaves the question as before, where it arose.

Traces of neolithic man are found mostly in the 'barrows' of Wiltshire, Gloucester, and Dorset. They are called 'long barrows' for they were succeeded by 'round barrows.' Some of the 'long barrows' contain a stone chamber within which interments of the dead took place, and it is here that evidence of the burial of the dead is found. In some cases the burial process has been preceded by cremation, in others no cremation has taken place, and in fact, from sufficient evidence, it has been proved that decay has often set in before the burial took place, a practice which is prevalent among many present-day savages. The use of flint for implements of cutting was still appreciated, and mining of the stone took place very largely. Flint shafts have been found at Grime's Graves in Norfolk and Cissbury in Sussex. Two shafts were sunk and connected afterwards at the bottom by a gallery. Sites of the factories for the making of flint tools are found also in Kent, in Antrim, Ireland, and in Spiennes in Belgium.

With safety it may be understood hat at this stage of human history nan occupied most of the temperate arts of the world, an area covering ne greater part of the earth's surface etween the poles, and from the deuctions made from discoveries in any places the theory of stone preling the use of iron for tools is suprted by them. In Japan extensive tchen middens' have been found contain numbers of chert implets, together with types of primipottery; the use of metal has found to follow in order. The e system has been found in the East. In China less opportunities xploration have been available, owing to hostile superstition satu ing the monuments that mark t progress. Evidences, however, h recently been discovered of a historic Neolithic culture in Chi It has also been proved beyond doubt that the same developme from stone to iron marked the histo of the Negro and Bantu races Africa. In S. Africa, Egypt, ar Somaliland large numbers of ston implements have been found.

In isolated countries like those o Scandinavia and Switzerland the his tory is clear; the former was free from interruption because of its isolated position, while the latter, protected by its mts. from disturbing peoples, enjoyed a similar peace. There are many mighty relics of the Stone age which are still in a good state of preservation, and among them the most notable are huge circles of stone. To these monuments countless superstitions have lent themselves. In England the two most noteworthy are those at Arbor Law in Derbyshire, and Stonehenge. At the latter the conclusion has been drawn that the stones were raised for the purpose of religious celebrations in the times of the Druids, and many stone implements in the form of hammers have been found buried on the site. Astronomical reasons have been assigned for the erection of the Stonehenge monoliths and tested by careful inquiries made under the direction of Sir Norman Lockyer and Prof. Penrose in Athens. With Stonehenge may be placed the point of separation between the Stone age and the age of metal or Bronze.

The appearance of the Bronze age may be said to date from 3000 B.C. in Crete, 2000 B.C. in France, 1800 B.C. in Britain. The first metallic products took the form of axes, elementary knives, and small tools and ornaments. With metal adoption may be placed the coming of the Celt, traced by evidences in the 'round barrows.' Pottery takes a prominent place in the implements used by the peoples of the time. As the Neolithic age was incalculably shorter than the Palæolithic, so the Bronze age was of less duration than the preceding period. It is certain that bronze tools preceded iron. The metal is a mixture of copper and tin, and here exists a proof of the apophthegm that the march of knowledge renders the next step less laborious, for iron can be procured direct from the ore. The casting of the bronze from the necessary copper and tin was, of course, of the most elementary character, a simple furnace in the ground dependent upon wind for its draught, and rough moulds of thick clay with a lip

at the rim. Large numbers of bronze implements are constantly being found in Britain, and the fact of their repeated discovery destroys the contention that the tools were imported. The weapons of the Bronze age were spears, swords, and axes or 'celts,' the edges being sharpened by stone hammers.

The introduction of iron began about 1000 B.C., the earliest evidence of which was found in S. Europe. From here it spread over all Europe. From this point advance was as rapid as it was previously slow, and once again the relative length of the period is shortened by the same tremendous rush of time. Contemporary with the advent of iron was the existence and use of gold. In Ireland the use of prehistoric metal presents many interesting data of study, and it is certain that the early wealth of that country must have been enormous. Curiously enough, silver was almost unknown yet in Europe, its only place of existence being the Mediterranean coast of Spain.

In the nineteenth century archæological excavation was concerned mostly with Europe and the Mediterranean civilisation. The most notable achievement was Schliemann's discovery of anct. Troy and his excavations at Mycenæ. He also pointed to Knossos as the centre of anct. Mediterranean culture, and subsequent excavations in Crete have revealed details of the Minoan civilisation. (*See also* CRETE.) Meanwhile an impetus had been given to archæological research by the decipherment of the Rosetta Stone by Champollion about 1830, and by the end of the century the history of anct. Egypt, through the genius of Prof. Flinders Petrie and others, was fairly completely unravelled. The crowning achievement of Egyptian A. was the discovery of Tutankhamen's (*q.v.*) tomb by [illegible] (*q.v.*) and Howard Cart[illegible] In this year also a [illegible] authorised by the [illegible] and the Museum o[illegible] set out under Leonard Woolley (*q.v.*) for Mesopotamia, which had for long been the centre of tentative research. The expedition was so far successful as to gather sufficient material to reconstruct the anct. S[illegible] civilisation of Ur (*q.v.*) [illegible] with indisputable evidenc[illegible] Flood and of a civilisation before the Flood.

From 1881 to 1894 A. P. Maudslay, together with the artist Catherwood, surveyed the monuments and ruins belonging to the pre-Spanish civilisation of Central America. Much still remains to be done, but research has enabled evidence to be put together of the Old Empire of the Mayas (*q.v.*) situated in Chiapas, Guatemala and Honduras. For reasons not yet incontestably explained there was an exodus of the Mayas in about [illegible] A.D., both to Yucatan and Oaxaca. The Mayas were thus brought into contact with the early Toltec culture of Mexico which preceded the Aztec, and their influences upon Mexican life and art can be traced. Mayan art has some affinities with ancient Egyptian art, and there is also a similarity between the designs, games, and recreations of anct. Mexico and [illegible]

[illegible] archæologists have been able to discover details of the barbaric empire of the Inca, which at the time of the Spanish conquest included the states now known as Ecuador, Peru, Bolivia, and part of Chile and Argentina. Some of the most valuable finds both from an archæological and artistic point of view have been those of hand-modelled pottery. From this pottery Prof. Uhle has deduced four successive periods of culture coexistent in Peru. The possibility of Mayan influence at one period may be admitted in so far as it may help to prove the whole of American culture to be indigenous in its origin, and the improbable theory of an immigration of peoples from China and Polynesia would then be discounted.

The modern progress of A. has made rapid strides. New and powerful aids in photo[illegible]

[illegible] ethnological value of all fossils and archæological remains, and to assist its march, and will [illegible] the available facts [illegible]

[illegible] Wales.

The importance [illegible] tion of the [illegible] A. deserves [illegible] has long been [illegible] view, or [illegible]

[illegible] never be restored [illegible] Earlier attempts [illegible] graphy, by [illegible] balloons and kites were [illegible] World War [illegible] vertical [illegible] purposes [illegible] to [illegible]

Archelaus

[illegible]t the build- [illegible]upervision, [illegible]r of eccles.

[illegible]e by mem- [illegible]yal family. [illegible]e all other [illegible]powers and

[illegible]nical term [illegible]e vegetable plants hav- It includes [illegible]orts and [illegible]ar Crypto- [illegible]ellas). [illegible] first, [illegible] applied to on the pro- [illegible]the mosses [illegible]ped with a [illegible]n *venter*, in [illegible]ore or egg- [illegible] place by which pass

[illegible]eptile found [illegible]d Permian [illegible]achian now [illegible] a huge [illegible] with [illegible]vith [illegible]ted

on their photographs the signs of soil disturbances in past centuries. Col. Beazeley, in Iraq during the War, in 1917, noted the traces of buried cities; while in England, in 1922, two air officers, Clark Hall and Haslam, first drew the attention of Mr. O. G. S. Crawford, archæological officer to the Ordnance Survey, to the traces, visible to the observer aloft, of disturbed land. The interest of the public in this form of exploration was first roused by Mr. Crawford's discovery, for the first time, of the complete course of an avenue at Stonehenge. This was in 1923, and in the following year Mr. Crawford published a volume containing about 300 aerial photographs.

Archæopteryx (Gk. ἀρχαῖος, ancient, πτέρυξ, wing), a fossil bird found in Bavaria which presents characteristics of birds and reptiles. It is the sole genus of the order Saururæ, and is the oldest known bird. Its size was that of a crow, it had teeth in both jaws, a lizard-like tail of twenty vertebræ, each giving rise to a quill feather, and three claw-like digits at the end of each wing. Two specimens are extant, *A. macrura* in Berlin, *A. lithographica* in the British Museum.

Archaism, meaning 'old,' derived from the Gk. It signifies the intentional use of an expression that is acknowledged to be out of date. The adjective derived from it is 'archaic.'

Archangel, a gov. of European Russia, a prov. of the Union of Socialist Soviet Republics. It is bounded on the N. by the White Sea and Arctic Ocean, on the W. by Finland and Olonets, on the S. by Vologda, and on the E. by the Ural ...ts. Included in its area are the ... of Novaya-Zembla, Vagach, and ...olguev, together with the Kola ...ninsula. A portion of the dist. ...s within the Arctic circle and is ...remely desolate and barren. In ... height of summer the soil is ...zen. All the rivs. are frozen from ...tember till July. They are ...omna, Onega, Dvina, Mezen, and ...hora. The climatic conditions ...he peninsula of Kola are more ...erate. Its surface is interrupted ...ills and large lakes, *e.g.* Imandra. ...e S. of the Arctic region the soil ...ered with forests, with here and ... lakes and morasses, and at in-...s good pasturage. Here the ...re closed from October to April. ...e N. dists. the inhab., neces-... nomadic, include Samoyedes, ...ns, Lapps, and Finnish tribes. ...support life by fishing and ...g. Its area is 331,505 sq. m., ... pop. 505,700. ...chief tn. is A. at the head of the delta of the Dvina. Its history has been traced back to the Norsemen of the tenth century. For some time A. was the only seaport of Russia. During the Great War it was in much the same condition, for with the closing of the Baltic and Black Sea ports, it was the only one left that was served by a rly. This led to its rapid development. It was the scene in 1918 of a serious attempt to combat Bolshevism. Allied forces, under British leadership, were landed there, being joined by Russian imperialists. The attempt proved abortive, since the Russians, converted by Bolshevist propaganda, turned on their allies, and forced them to evacuate the dist. The evacuation of the British forces both in A. and in Murmansk was carried out by General Lord Rawlinson's North Russian Relief Force, which landed at Archangel in the spring of 1919. Its manufs. are linen, leather, canvas, cord, mats, tallow, potash, and beer. Saw-milling is an important industry. Its harbour is open from May to October. The shortest day has only 3 hrs. 12 mins., while the longest is 21 hrs. 48 mins. The pop. of the city in 1926 was 71,091.

Archangel, a name sometimes given to two species of Labiatæ, or nettle family.

Archbald, a bor. in Lackawanna co., Penn., U.S.A., 10 m. N.E. of Scranton. Coal is worked and the chief industry is weaving. Pop. 9587.

Archbishop, the title of a bishop of superior rank who has jurisdiction over other bishops. The title when it first came into existence did not imply that the holder had metropolitan power. In the Roman church at the present time, however, the title of A. can usually be said to imply metropolitan power. In other churches the terms, however, are not interchangeable. The title seems to have been first used in the early church, being used by Athanasius and by Gregory to imply respect to their predecessors. In the eastern church the title was much more common than in the western, but gradually, with the right to summon provincial councils, the metropolitans began to assume the title of A. The As., however, were not allowed to assume authority independently of the papacy, since they were compelled to receive the 'pall' at the hands of the Bishop of Rome. In the Roman church the power of the modern A. is hardly comparable with the power of the mediæval bishop. The right to wear the 'pall' is only granted to such As. as have metropolitan jurisdiction, since there are a number who have merely titular archbishoprics. Until the pall is

received and the oaths of fidelity and obedience are taken to the papacy the A. is only recognised as the A.-elect, and cannot use his full powers. In England the church is governed by two As., the A. of Canterbury, who is also 'Primate of all England,' and the A. of York, who is 'Primate of England.' At the time of the foundation of the church by St. Augustine the original plan was to divide England into the two provs. with two As., one at London and one at York, who were to take precedence according to seniority, but during the pre-Reformation period the metropolitan of Canterbury exercised the functions of papal legate throughout all England. At the present day he possesses powers over both provs., he can grant licences for marriage which are valid in both provs., and can appoint notaries who can practise in both provs. Amongst his other powers he numbers an ability to grant Lambeth degrees in music, law, and theology. As the metropolitan of the southern prov. he is the guardian of all vacant sees, and appoints to benefices during such vacancy. He has also jurisdiction over all bishops within his prov., and has the privilege of visitation and deprivation which is not exercised by the A. of York. It is also his privilege to crown the kings and queens of England, and to consecrate all bishops within his prov. He is also an eccles. commissioner for England. He takes precedence immediately after the princes of royal blood. The powers of the A. of York are very similar to those of the A. of Canterbury, with the exceptions which have been pointed out. The As. of York have the privilege of crowning the queen consort, and of being her perpetual chaplain. The A. is one of the eccles. commissioners of England, takes precedence after princes of the royal blood, and the lord chancellor. As. have the title of His Grace, and Reverend Father in God.

Archdeacon, a high office of the Christian church whose rank is directly subordinate to that of bishop. Originally he was the chief of the deacons who assisted the bishop in eccles. affairs. The distribution of the dioceses into archdeaconries cannot be assigned to any certain time. In the fifth century As. rose from mere bishops' assistants, and took upon themselves some of a bishop's powers and privileges. Gradually they acquired a position which was recognised apart from the bishop, and claimed a jurisdiction to themselves. In the thirteenth century protests from sev. synods were successful in securing a curtailment of their powers by episcopal courts. It is their special duty to inspect the buildings within their range of supervision, and to undertake the repair of eccles. property.

Archduke, a title borne by members of the Austrian royal family. It denoted a rank above all other dukes, bearing superior powers and rights.

Archegoniata is a botanical term applied to the div. of the vegetable kingdom which contains plants having an *archegonium* (*q.v.*). It includes the Bryophyta (liverworts and mosses), and the Vascular Cryptogams (ferns and selaginellas).

Archegonium (Gk. ἀρχή, first, γόνος, offspring) is a term applied to the female sexual organ on the prothallus of such plants as the mosses and ferns. It is flask-shaped with a slender *neck* and a swollen *venter*, in which is the ovum (*oosphore or egg-cell*). Fertilisation takes place by means of spermatozoids which pass down the neck.

Archegosaurus, a fossil reptile found in the Carboniferous and Permian formations. It is a batrachian now extinct, with the form of a huge lizard. It has a pointed skull, with the temporal region roofed over with bony plates. Its body is protected by scales, particularly the ventral region, which is defended by three large bony plates. It has short legs, a long thick tail, and teeth with much in-folding.

Archeion, a Gk. word meaning sanctuary. It was used in Greece to denote gov. buildings, but was especially the name of the building where the archives were kept.

Archelaus, King of Macedonia (413–399 B.C.), obtained the throne by the murder of his uncle, cousin, and half-brother. He ruled wisely, and attempted to inculcate the refinements of Gk. civilisation among his subjects. He *d.* in 399.

Archelaus of Cappadocia (first century B.C.), a general of Mithradates the Great. In 87 B.C. he was sent to Greece with a large army, and was besieged by Sulla and defeated. Later he deserted to the Roms.

Archelaus, his son, King of Egypt. In 56 B.C. he married Berenice. He only reigned six months, being defeated and slain by Aulus Gabinius in 55 B.C.

Archelaus (*d.* A.D. 16), son of A. and Glaphyra, received the kingdom of Cappadocia, 36 B.C. He fought on the side of Antonius at the battle of Actium, yet he retained his kingdom under Augustus. Incurring the displeasure of Tiberius, as it is said, because he neglected the future emperor during his exile at Rhodes, he was summoned to Rome, where he *d.*,

apparently a natural death brought on by old age and infirmity. (Tacitus, *Ann.* ii. 42; Dion. lvii.)

Archelaus of Miletus, Gk. philosopher of Athens. He lived during the fifth century, and was a pupil of Anaxagoras. Ion of Chios says he was a teacher of Socrates. The only traces of his work are to be found in quotations from Diogenes Laërtius, Simplicius, Plutarch, and Hippolytus.

Archelaus, Bishop of Carrhæ in Mesopotamia, had a controversy with the heretic Manes *c.* A.D. 278. He pub. the controversy in two books, entitled *Acta Disputationis*, etc., in Syriac, which were trans. into Gk. by Hegemonius. A fragment of this work is extant, ed. by Valesius, in the notes of his *Socrates*, pp. 197, 203, lib. i. c. 22; and again in a more complete form by Zaccagnius in his *Collectanea Monumentorum veterum Ecclesiæ Græcæ*, Rom. 1698 (Fabricius, *Bibl. Gr.*).

Archelaus (*fl.* A.D. 10), King of Judæa, son of Herod the Great. He refused to accept the throne before obtaining the consent of Augustus. His journey in quest of Augustus' agreement was successful. A violation of the Mosaic law caused his deposition and banishment.

Archenholz, Johann Wilhelm, von 1743–1812), a Ger. historian. He was *b.* at Langfuhr, Dantzic. At the age of sixteen he entered the Prussian army, taking part in the concluding stages of the Seven Years' War. His history of the war is the work by which he is best known, and by which he became recognised as an historian of brilliant power. His other works include *England und Italien*, *Annalen der Britischen Geschichte*, and various periodicals of a literary and political colour. He *d.* at Oyendorf, near Hamburg.

Archer, Edward (1718–89), physician, *b.* in Scotland and studied in Edinburgh and Leyden. Became physician to the Small-pox Hospital in 1747, and devoted his whole life to it. A great advocate of inoculation.

Archer-Fish, the *Toxotes*, an Acanthopterygious fish of the family Toxotidæ, found off the Australian and Indian coasts. It casts a drop of water from its mouth on to an insect resting near the surface of the sea, causing it to fall in, when it is devoured.

Archer, Fred (1857–86), jockey; *b.* at Cheltenham. Rode his first race 1870. Won the Derby five times, Oaks four, St. Leger six, Two Thousand Guineas five.

Archer, Frederick Scott (1813–57), *b.* at Bishop Stortford. Inventor of the collodion process in photography and sev. improvements to the camera.

Archer, James: (1) Irish Jesuit (*c.* 1551–1624). First rector of Irish College at Salamanca. (2) Catholic preacher who *fl.* in the early nineteenth century. Little is known of his private life. (3) Scotch artist, *b.* at Edinburgh, 1824. Became portrait-painter, and had many commissions in the U.S.A. and India.

Archer, John: (1) (1598–1682), Judge. Called to bar, 1620; became justice of Common Bench, and was knighted, 1663. Connected with Lord Morley trial. (2) Court physician to Charles II. A noted 'quack.'

Archer, John Wykeham (1806–64), Eng. painter, engraver, and antiquary, *b.* at Newcastle. Pub. *Vestiges of Old London*, and many sketches of London. Also executed several monumental brasses.

Archer, Thomas, actor and dramatist. First appeared at Drury Lane, 1823. Author of numerous adaptations from the Fr. and *Blood Royal*. Died 1848.

Archer, Thomas, architect, *d.* 1743. Pupil of Sir John Vanbrugh. Architect of Heythorpe Hall, Oxfordshire; St. Philip's, Birmingham; St. John's, Westminster, etc.

Archer, William (1830–97), naturalist, secretary of sev. learned societies and librarian of Royal Dublin Society and National Library of Ireland. Specialised on minute fresh-water organisms.

Archer, William, (1856–1924) dramatic critic, *b.* at Perth Sept. 23, 1856: son of Thos. Archer, C.M.G., of Queensland. Received degree of M.A. at Edinburgh, 1876. Travelled in Australia, 1876–7; and, after returning to Edinburgh, went to London, where he soon took a prominent position in the literary world. He was dramatic critic on the *London Figaro*, 1879–81; travelled in Italy 1881–2; called to the bar, 1883; became dramatic critic on the *World*, 1884. He left this in 1905 for the *Tribune*; and, later, went to the *Nation*. He did much to popularise Ibsen in England, beginning by producing his translation of the *Pillars of Society* at the Gaiety in 1880. He also translated *A Doll's House*, 1889; *Peer Gynt*, 1892; together with his brother, Major Charles A., the *Master Builder*, 1893; *Little Eyolf*, 1895; Brandes' *A Visit*, 1892; and *John Gabriel Borkman*, 1897, as well as editing Ibsen's prose dramas in 5 vols., 1890–1. His works include: *English Dramatists of To-day*, 1882; *Masks or Faces*, 1888; *The Theatrical World*, 1893–7; *Study and Stage*, 1899; *America To-day*, 1900; *Poets of the Younger Generation*, 1901; *Real Conversations*, 1904; *A National Theatre: Schemes and Estimates*, with H. Granville Barker, 1907; *Through*

Afro-America, 1910; *Life, Trial, and Death of Francisco Ferrer*, 1911; *Play-making*, 1912; *The Great Analysis*, 1912; *The Thirteen Days*, 1915; *India and the Future*, 1917; *War is War* (drama), 1919; *The Green Goddess* (popular drama), 1921; *The Old Drama and the New*, 1923; He also wrote three plays published posthumously: *Martha Washington: Beatrix Juana:* and *Lidia*. He *d.* in London after an operation, Dec. 27, 1924. He was an agnostic; but, as regards drama, never lost faith in the 'well-made' play form of the nineteenth century.

Archery, the use of the bow and arrow, both for hunting and warfare, is widespread and dates from very early times. The foremost archers of antiquity were the Egyptians, who used bows a little shorter than a man, and arrows, headed with bronze or flint, 2 to 3 ft. long. On the authority of the Bible and other writers, the Jews were deadly with the bow, which seems with them to have been made of reed, wood, or horn. All Asiatic nations were bowmen, notably the Babylonians, Persians, and Scythians. In mediæval times the Arabs and Turks were famous archers, as were the Japanese till recent times. Exploration has revealed the use of the bow among the natives of the E. and W. Indies, S. America, the Arctic circle, and Central Africa. The Germanic nations and the Welsh appear to have been most proficient in A. in early European history. The Gks. and Roms. in anct. times, despite the legends of Teucer, Ulysses, etc., seem to have been indifferent archers, and recruited their bowmen from Crete and Asia Minor. After the fourth century A.D., however, the Rom. army consisted largely of mounted archers. Scandinavian legend has many references to famous bowmen,



ARCHERY (14TH CENTURY)

and by the tenth century the short bow was the chief weapon of the poorest military classes in England, France, and Germany. Both the Eng. and Normans employed mounted archers at Hastings in 1066. The cross-bow, or arbalest, for the shooting of bolts, which was mounted on a stock and discharged by a catch or trigger, was also much in use, especially in sieges and naval battles, though it was condemned by the Lateran Council of 1139. It made its reputation in the Crusades, proving much superior to the bow used by the mounted Asiatic archers. In Europe the best exponents of its use were the Genoese, Pisans, and Venetians. Its use in England was forbidden by Henry VII. The famous English long-bow, 5 ft. long, with a shaft a cloth-yard long, seems to have been introduced from Wales. Its long range and speed were proved at Falkirk in 1298, and the Eng. archers played an important part at Creçy, Poitiers, and Agincourt. A. was supported by all the kings, who encouraged its practice for sport, as is witnessed by the many ballads on the



ARCHERS AT AGINCOURT

skill of Eng. marksmen. The introduction of gun-powder, which began early in the fifteenth century, naturally meant the gradual decay of A., but its disappearance in England was slow. In the reign of Elizabeth treatises on the art were still being written; notably the *Toxophilus* of Roger Ascham, 1545, a detailed and practical work. The long-bow died out at the end of the sixteenth century and the cross-bow early in the seventeenth. In 1807 horse archers were used in Poland against Napoleon, and in 1860the Chinese used bows at Taku. In the mid-eighteenth century there was a great revival of A. for purposes of health and exercise, which resulted in 1781 in the formation of the Royal Toxophilite Society. Other societies for the practice and encouragement of the art are the Woodmen of Arden, 1785, having headquarters at Meriden in Warwickshire; John o' Gaunt's Bowmen, 1785, and the Royal Company of Archers (Scotland), dating from 1676. The main legislative and managing body of English A. at the present day is the Grand National Archery Society, founded 1861, which holds meetings for the sport, the most important being the championship, the Leam-

ington and Midland counties, the Crystal Palace, the Grand Western, and the Grand Northern. Modern bows are usually made of yew, either 'self,' or backed with other woods. The former, though the truer and more sensitive, are more expensive, and liable to crack and lose shape. The length of the bow varies from 5 to 6 ft., according to that of the arrows used (25–30 in). The string is made of three strands of hemp, dressed with glue, and has a drawing power of 40–60 lb. for men, and 24–32 for ladies. The arrow has a shaft, which may be of various shapes, made of red deal, a 'pile,' or point, and 'nock,' cut square, and three turkey or peacock feathers, all curving one way.

Arches, Court of, an eccles. court of appeal of the Archbishop of Canterbury, so called because it was anciently held at the church of St. Mary of the Arches, now St. Mary-le-Bow. It has power to deal with suits sent up from the consistorial courts of the prov. of Canterbury. The presiding judge was originally known as the official prin., but his duties and title have now become merged with those of his subordinate, the dean of the arches. Since 1874 he has also been chief judge of the Chancery Court of York.

Archias, A. Licinius, a Gk poet. who was *b.* at Antioch in Syria *c.* 120 B.C. He gave lessons to Cicero in philosophy and rhetoric (Archias, c. 1), and came to Rome in 102, where he gained the friendship of the Luculli. He became a citizen at Heraclea in Lucania; and when this tn. was united to Rome he became a Rom. citizen. When he was accused in 61 of usurping the citizenship of Rome, he was defended by Cicero in the speech 'Pro Archia.' A. commemorated the victories of Marius and Lutatius Catulus over the Cimbri in a poem, and some of his epigrams are in the Gk. anthology.

Archibald, Sir A. G., Canadian statesman, *b.* at Truro, Nova Scotia, 1814. Secretary of State for the dominion, 1867–8; first lieutenant-governor of Manitoba, 1870–2; lieutenant-governor of Nova Scotia, 1873–83. Knighted 1885. Died at Truro, 1892.

Archidamus. There were five kings of Sparta of this name. They were of the royal line of the Proclidæ. The first is only mentioned by Herodotus (viii. 131).

Archidamus II., son of Zeuxidamus, became king when his grandfather, Leotychides, was banished from Sparta. A. reigned from 469 to 427 B.C. Prudence and foresight, steadiness of purpose and gravity of do- [illegible] was nearly annihilated by an earthquake, an opportunity of which the Messenians took advantage to attempt the recovery of their independence. A., by his presence of mind, saved what remained of the city from the hands of an exasperated foe; but it was not till the end of ten years that this third Messenian war was brought to a close, when the Messenians evacuated their citadel, Ithome. (Diod. Sic. xi. 64; Thucyd. i. 103.) A. is not mentioned again till we find him speaking on the peace side in the council held by the Lacedæmonians before they resolved on the Peloponnesian War. Though a declaration of war was the result of their deliberation (431 B [illegible] gave him th [illegible] against the [illegible] general also [illegible] tion (430 B. [illegible] (428 B.C.). He was succeeded by his son, Agis II., probably in 427 B.C. (Thucydides, i. 79; ii. 10–20, 71; iii.1.)

[illegible] III. [illegible] 338 B.C.), the [illegible] d his father [illegible] the Spartan [illegible] r's lifetime, 367 B.C., and gained the 'tearless battle' against the Arcadians and Argeians: not one of the Spartans fell, but a great many of the enemy were slaughtered. He was sent (338 B.C.) to Italy to assist the inhabitants of Tarentum, who were at war with the Lucanians. He fell bravely at the head of his troops, and a statue was erected to his honour at Olympia by his countrymen. He was succeeded by his son, Agis III. (Diodorus Sic. xvi. 24, 63; Pausanias, iii. 10.)

Archidamus IV., grandson of A. III., King of Sparta in 294 B.C.

Archidamus V., grandson of A. IV., King of Sparta in 240 B.C.

Archidona, tn. of Andalusia, Spain, 34 m. W. of Malaga. Pop. 8880.

Archigenes of Apamea lived during the reign of the Emperor Trajan, and was a medical author and practitioner at Rome (*see* Juvenal, *Satires*, vi. 236; xiii. 98; xiv. 252). He followed the principles of the pneumatic sect, founded by Athenæus of Attalia, and wrote treatises on pathology and the practice of medicine and surgery. His fragments are in the works of Galen, Aetius, and Oribasius.

Archil, or Orchil, a violet dye which is obtained from several species of lichens, notably from the *Roccella tinctoria*. As materials dyed solely with it fade readily in the sunlight, another dye is usually employed at first and the A. is used to give an added brilliance.

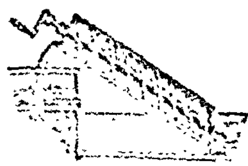
Archilochus, Gk. lyric poet, probably of seventh century B.C., b. at Paros, which he left to join the colony of Thasos. Killed in battle between the Parians and Naxians. He enjoyed a very high repute among the ancts., especially for his iambic satiric poems. The few fragments of his work which remain, though vigorous and wide in range, hardly justify extravagant eulogy.

Archimagus, or the Anglicised form **Archimage**, was used to denote a chief magician, a mighty worker of things 'mystic, wonderful.' In Spenser's *Faerie Queene* it is applied to the personification of hypocrisy.

Archimandrite, the title of the highest order of superiors of convents in the Gk. Church, almost corresponding to that of abbot in the Latin Church. Russian bishops are chosen from the archimandrites.

Archimedes (287–212 B.C.), the most celebrated mathematician and engineer of antiquity; b. at Syracuse. He is said to have been a kinsman of King Hiero. His mathematical studies relate chiefly to the relation of spherical and rectilineal surfaces and bodies, but he is most famous for his discoveries in hydrostatics and mechanics. He estab. the principles of the lever, and of the equilibrium between a floating body and the hydrostatic pressure of the liquid in which it floats, and invented many military engines which postponed the fall of Syracuse. He was killed when the city was taken by the Roms.

Archimedes' Screw, a machine for raising water. It may consist of a tube wound spirally round a cylindrical axis or a cylinder enclosing a screw so as to form a spiral chamber from end to end. The lowest portion of the screw just dips into the water, and as the cylinder is turned a small quantity of water is scooped up. The inclination of the cylinder is such that at the next revolution the water is raised above the next thread, whilst the lowest thread scoops up another quantity. The successive revolutions, therefore, raise the water thread by thread to emerge at the top of the cylinder. The machine is used in Holland for draining purposes, and the same principle is sometimes used for raising grain to a higher level in a continuous stream.



ARCHIMEDES' SCREW

Archinard, Louis, b. at Havre in 1850, a famous Fr. general. He entered the naval artillery, served in Senegal, became chief of the squadron, 1884, went to the Soudan, took Segou-Sikoro, and was made lieutenant-colonel. In 1891 he took Niori, Youri, and Bissandougou, and in 1892 he was recalled to France and made colonel. He afterwards returned to the Soudan as commander-general, which position he held until 1893.

Archinos, an Athenian who lived during the latter part of the fourth and the beginning of the fifth centuries, was the companion of Thrasybulus. He helped to overthrow the Thirty Tyrants of Athens, and was mainly instrumental in bringing about the famous amnesty when the democracy was restored in 403. It was owing to him that public documents were written in Ionian instead of in Attic characters.

Archinto was the name of a celebrated family of Milan whose prin. members were: (1) A. (1500–58), Archbishop of Milan. (2) Alexander A., a theologian who d. in 1558. (3) Count Philip A., b. in 1649, governor of Cremona 1692–94. (4) Joseph A. (1649–1712), Cardinal and Archbishop of Milan. (5) Charles A. (1669–1732), son of Joseph A., who pub. Muratori's *Scriptores rerum Italicarum*, and founded the Palatine Society.

Archipelago, a Gk. term (chief sea) originally applied to the Ægean Sea, and now to any sea thickly scattered with islands.

Architects, American Institute of, is the national organisation of architects in the U.S.A. Of the [illegible] practising architects in the U.S., more than 3000 are members of the Institute. The Institute was founded in 1857, and has its headquarters in the Octagon, Washington [illegible] is governed by its officers and a board of directors who meet [illegible]. These are elected by the delegates from the fifty-eight chapters throughout the country at their annual meeting. In addition to the members, there are [illegible] and honorary corresponding members in foreign countries. [illegible] the Institute [illegible] (1930) and among [illegible] the monthly *Journal of the American Institute of Architects*. The object of the Institute is to [illegible] for those engaged in [illegible] of architecture [illegible] interests, and [illegible] the art and science [illegible]. The methods [illegible] promoted include the [illegible] of committees [illegible] tectural [illegible] lectures. [illegible] attention [illegible] Institute [illegible] the art of [illegible]

of painting, sculpture, and landscape gardening. Town planning, too, is receiving increasing recognition by the Institute.

Architects, Royal Institute of British, founded 1834, incorporated 1837, re-incorporated 1887. The chief Eng. architectural body. It holds examinations and confers the diplomas of Associate (A.R.I.B.A.) and Fellow (F.R.I.B.A.).

Architects, Society of, founded 1884, incorporated 1893, holds examinations twice a year in April and October.

Architectural Association, a body constituted in 1847 for the purpose of giving instruction in those branches of architectural knowledge which are not covered by the training received in the offices where the pupils are engaged. It awards certificates, medals, and prizes, and finally prepares for the examinations of the Royal Institute of British Architects. It works in full agreement with the other societies, its fees are moderate, and its lecturers include the most able men of the time.

Architecture (Lat. *architectura*, Gk. ἀρχιτεκτονία—αρχι, chief, and τέκτων, a builder). In the widest sense of the word, A. includes all kinds of building and construction, with four main divisions. Eccles. A. deals with the erection of churches and houses dedicated to God; civil A. has to do with buildings for the ordinary purposes of the state and the individual; military A. deals with fortifications and constructions for attack and defence; naval A. concerns itself with the construction of ships, and all the fittings incident on their use. But this is by no means the general meaning of the term A., which may better be defined as building become an art, building which is not controlled only by aims of use and comfort, but also by aims of beauty, grandeur, and other æsthetic principles. So Ruskin in the *Seven Lamps of Architecture* says: 'A. is the art which so disposes and adorns the edifices raised by man . . . that the sight of them contributes to his mental health, power, and pleasure.' Until the Renaissance, A. was universally regarded as the chief of the arts, and it is here that we can easily see portrayed much of the spirit and the genius of each of the races which have employed it. Like every other art, it has ever been conservative, but in the change of the A. we may see mirrored changes in government or in prevailing influence or the steady process of decay. Most especially is this true of the Gothic A., for the splendid cathedrals of Europe in one or other of the Gothic styles are the greatest and clearest embodiment of the spirit of the middle ages. It was a spirit which, though shared by a Europe united at last by the ties of religion, yet showed itself variously in the individual countries. It is noticeable, too, that though architectural features have been handed from nation to nation, yet originally each people had its own system, a system regulated primarily by the climate and the building materials at hand. For A. did not spring into being fully armed; her beginnings are, on the contrary, extremely modest. It has been said that building bega[illegible] types, accord[illegible] forms of occu[illegible] The hunter, [illegible] course to shelter by the inclemency of the weather, would have recourse to caves in the rock, for the huntsman is proverbially averse to any steady and [illegible] shepherd, [illegible] ould need [illegible] shelter; hence he would construct something in the shape of a tent. The farmer, on the other hand, would require not only a shelter for himself, but also for his possessions, and so would need a more stable home. Hence came the origin of the hut, and from it all modern building. The first material used for these erections must plainly have been wood, and this theory is confirmed by the fact that even the stone erections of Egypt are accurate copies of wooden buildings. Even in the great Gk. orders, indeed, does the imitation of wood construction still remain, *e.g.* in the dentils of the entablature which are a copy of the wooden rafters projecting over the edge of the building. Next, probably bricks, moulded and dried in the sun, were used, and finally stone was cut and moulded.

But apart from this regular development of the science there are certain prehistoric remains, which, though off the regular line, and of archæological rather than of architectural value, may be shortly dealt with here. They may be classified as:—

Monoliths, or single upright stones of imposing size, known also as *menhirs*. The best known is the Carnac Stone (Brittany), 63 ft. high, 14 ft. in diameter, and weighing 260 tons.

[illegible] *lolmens*, [illegible] stones [illegible] he best- [illegible] House, between Maidstone and Rochester, where the flat table stone is about 12 ft. long, 9¼ ft. wide, and 2 ft. thick. Its weight would be about 10½ tons, and it is supported by three vertical supports instead of two.

Circles of stone.—Though traces of the practice of erecting these circles are to be found in most parts of the world, the most famous, and probably the most ancient example is at Stonehenge. According to the general reconstruction, the outer ring of this circle had a diameter of 105 ft., and some of the vertical stones have a height of 18 ft. Another example is at Avebury, in Wiltshire.

Lake dwellings, wooden huts erected on piles, the remains of which have been discovered in Switzerland, Italy, etc., so placed to secure their inhabitants from attack.

Tumuli and *cairns* may also be mentioned among these prehistoric structures, partly on account of their being found so universally, and partly because the pyramids, the great monuments of that Egyptian A. which must now be dealt with, are linked on to them by the fact that they also were primarily sepulchral monuments.

Egypt.—Though investigations seem to show that the earliest stable buildings of mankind were erected in the valley of the Euphrates and the Tigris, yet it is to Egypt, the valley of the Nile, that we must look for our most ancient remains of A., which date back to the period of the Ancient Empire, c. 4000 B.C. At that time the capital was at Memphis, and it is round this town that the early tombs are found. To the same period belong the three pyramids generally known by the names of the kings who erected them as Cheops, Cephren, and Mycerinus. The pyramids were erected to receive the body of the king, and are all built on a square base, from which, in the case of Cheops, the largest, the pyramid rose to a height of 480 ft., the length of one side of the base in the same pyramid being 760 ft. Neither the pyramids nor the *mastaba* tombs of the same date possess marked architectural features, and it is not until about 2775 B.C. that, in the tombs at Beni-Hassan (Upper Egypt), we find the germ of an important style. These tombs are cut in the solid rock, and here various types of columns are found in use, one of them being the prototype of the Gk. Doric order. But it was not until the New Empire under the Theban kings (c. 1700 B.C.) that the great age of Egyptian A. began. Of its temples, some were entirely excavated, some were partly excavated, partly structural, and some were entirely structural. Round about Thebes are to be found many magnificent remains of the industry and conceptive power of this period. On the E. bank of the Nile are the great temple of Karnak and the temple of Chous, on the W. bank lay the sepulchral temple of Deir el-Bahri and the Ramesseum. [illegible] temples generally consisted of [illegible] prin. parts: (1) the pylon, two massive stone towers on either side of the doorway; (2) the courtyard, [illegible] the sky in the centre. [illegible] rounded on three sides by a [illegible] colonnade, and led to (3) [illegible] columns, lighted only by a [illegible] and having rows of [illegible] the centre. Beyond [illegible] sanctuary, surrounded [illegible] by (5) the halls of [illegible] style of temple continued [illegible] teristic Egyptian [illegible] Ptolemaic dynasty. [illegible] worthy points in [illegible] are to be seen as [illegible] Empire, and [illegible] changed, for the [illegible] have had little [illegible] First to be noted [illegible] pinquity of the [illegible] appear- tracted extr[illegible] These ance of size [illegible] too columns had [illegible] most used, numerous [illegible] lotus and however. [illegible] The temples 'palm-c[illegible] batter-walls, regularly [illegible] which is quite uncertain. the orig[illegible] used in construc- The arch [illegible] tion.

Assyria and Babylonia.—The three separate empires, the First Babylonian, the Assyrian, and the New Babylonian, were all remarkable for building activity, and all built in much the same style. During the early period the principal erections were temples which were built on the top of *ziggurats* or artificial mounds. These temples are several stories in height, the stories being built on receding terraces. These and the other structures, such as palaces, which were also placed on mounds, were constructed of sun-dried bricks, faced by burnt bricks and brilliantly-coloured tiles. The whole surface of Chaldæa is dotted with the remains of these temples, each on its ziggurat, but the most famous is that of Birs-Nimroud, which was either founded or rebuilt by Nebuchadnezzar, which cylinders found on the spot tell us was built in seven stories and was dedicated to the seven planets. The Assyrian Period was essentially a palace-building epoch, and its chief remains are the palaces at Nineveh, Nimroud, and Khorsabad. The palace of Sargon at the last-named place is one of the best examples of the general type[illegible] was built on a terrace of bri[illegible] raised 18 ft. above the groun[illegible] consisted of three main di[illegible] halls and general apartm[illegible] harem, and (3) the [illegible]

service rooms. Apart from the building were the ziggurat and temple, and in the centre of the buildings was a large courtyard. In the case of the temple of Sargon, this courtyard was entered by portals which probably form the greatest creations of Assyrian A., flanked as they were by ten winged human-headed bulls, some of which are now preserved in the British Museum. Though externally the Assyrian decoration was of the simplest and most massive kind, yet inside it was more detailed. Stucco, dadoes, bas-reliefs, and colouring were freely used. A remarkable feature of the buildings was their great length and extreme narrowness. This was doubtless due to the fact that the column was in little use in Assyria, whereas the arch was, and so consequently no width was allowed greater than could be spanned by a single dome or tunnel-vault. The Assyrian style, then, was in direct contrast with the Egyptian. In the one we have rows of columns, straight lintels, and flat ceilings; in the other an absence of columns, compensated for by the use of vaults and arches. The Assyrian had the greater influence, extending even to China. The temple at Jerusalem, the only historical monument of Jewish A., must, according to the biblical narrative, have been built on the Assyrian plan.

Persia.—Since the religion of Persia required no temples, and their customs were adverse to elaborate tombs, it is to their palaces that we must look for their architectural works. The first of these is the palace of Cyrus, erected at Pasargadæ in the sixth century B.C. There are but few remains left, and these show it to have been built on the simplest of plans. Later remains at Persepolis and Susa re more interesting. At the former f these tns. the builders made use of natural platform on a range of hills, hich they first enclosed with a stone all. It was approached by a magficent flight of steps at the N.W., ch step being 22 in. wide, with a ead of 15 in. and a rise of 4 in. On s platform are to be found the ruins the palace of Darius, the palace of Hundred Columns (also erected Darius), and the palace and hypoe hall of Xerxes. The last named ar the most important, and is, ed, one of the architectural won of antiquity, for, though it con only of a hall and three porticoes, overs a greater area than any ic cathedral except that of Milan. columns are 65 ft. high from base pital. They are fluted after the an model, and the capitals are o kinds, the one double bull-headed and the other formed of a Ionic capital set on end over a lotu capital evidently copied from th Egyptian. Of the original number o seventy-two columns in black marble only seventeen are now *in situ*. At the head of the great stairway stands a propylæon, or entrance-hall, flanked by immense human-headed bulls worthy to be ranked with the Assyrian productions. After the erection of the great palaces of Persepolis and Susa, the history of Central Asiatic A. is almost a blank until the time of the Sassanian dynasty. We say 'almost,' for one important monument of the Parthian monarchy has recently been investigated—the palace of El Hadr, in the valley of the Tigris. The city was besieged by Trajan in 116 A.D., and is mentioned then as a large city, containing a temple of the sun. This is probably the square building at the back of the palace. The remains show that the barrel-vault tradition was continued, but that the ornament was under the influence of the great western styles. The first of the Sassanian kings came to the throne about A.D. 225, but no monuments of the next hundred years remain, at about which time we have the palace of Serbistan. This shows that the old Persian and Parthian traditions were continued, though an enlarged acquaintance with Rom. work is indicated by the improvements in the plan. Stone is to be found taking the place of brick, and the dome is introduced to cover the principal portions of the building, such as the great hall in this palace. Other palaces are at Ctesiphon and Firozabad, and these are formed on the Assyrian model, even more than that at Serbistan. The barrel-vault, disused by the old Persians but revived by the Parthians, is used in all the chambers. The palace at Ctesiphon is built of brick, for it is situated in the S. plains near Bagdad, where no stone is to be found. It is, however, of far greater dimensions than the others. Its main front must have measured 312 ft., and its height must have been 115 ft.

China.—We have already noticed that the normal architectural styles are founded on the primitive hut, but that of China forms a notable exception. The early Chinese tribes were certainly nomadic, and their norm for buildings was the tent. Then, secondly, the Chinese seem to have shown none of that desire to improve and go on improving which has characterised western nations, and so their manner of building has remained practically stationary throughout the ages. It is hampered, too, by strange rules, for no person is allowed to have a house larger or smaller than

his position as a citizen allows him. The temples, too, are no more than large houses. They are built chiefly of wood, and decorated in bright colours with tiles, etc., and the construction is remarkable in that the roof is not supported by the walls, but by a wooden framework. It is, in fact, put on before the panels of the wall are filled in. The complete structure strongly resembles an enclosed tent, and the appearance of a Chinese city is that of a vast encampment. Though the use of brick and stone has been known to the Chinese since very early times, these materials are not much in request. The Great Wall of China is the only great erection of stone, and that fails to come into the domain of A.

India.—The Indian styles must be divided into three distinct groups: the Buddhist, the Jaina, and the Hindu. The first of these comprises various classes of buildings, of which the chief are the *topes*, temples containing relics or marking a spot of peculiar sanctity, and the *viharas* or monasteries. The symbolic sculpture is the point of chief interest about them. Columns are used, short and with a superabundance of ornament. The Jaina temples consist of a square shrine-cell, lighted from the door only, to which a large hall gives entrance. The hall with columns is so arranged as to support the weight of a large dome which rises from the cell. The sculpture is excessively rich, and the whole style is far lighter and more delicate than the Buddhist. The Hindu A. again subdivides into three classes: the Northern, Central, and Southern Indian. These vary among themselves, but all bear a strong resemblance to the Jaina style. The Southern (or Dravidian) style has the cell surmounted by a storied tower, instead of the curved pyramidal roof which is to be found in the Northern. The Central (or Chalukyan) style shares the features of the other two, Everywhere attention is given to detail rather than to the general appearance.

Greece.—The finished A. of Greece stands alone among the As. of the world in its entire perfection, and, as in the realms of literature, it is the Gks. pre-eminently who have ruled and guided the whole of Europe, so is it in A. But its development was gradual, and to this probably we owe its excellence. The Mycenæan period, sometimes known as the Cyclopic or Pelasgic, differed considerably from the Hellenic period which followed it, but from the commencement of this latter (c. 700 B.C.) we see a gradual improvement in the application of the same principles. Simplicity, unity, and the harmony of minutely exact proportions are the characteristics of the final styles. Of the Mycenæan period, chiefly before 1000 B.C., but few monuments remain, and some date from the still earlier Minoan age. Of these last the principal is the palace of Cnossus in Crete, discovered by Dr. Arthur Evans. Other remains are at Argos, Mycenæ, Athens, and Tiryns, at which place the palace was excavated by Dr. Schliemann. Only the bases of the timber columns are in position, but the material used is quite clear. The walls were built of roughly-shaped masses of stone united, not by cramp-irons as later, but by clay mortar. From the Mycenæan tombs we learn that the arch, the absence of which is so conspicuous in Hellenic A., was perfectly well known. One is to be found at Cnidus, and another at Delos, the latter a triangular-headed opening formed by two inclined blocks. Among the earliest of the beehive tombs found around Mycenæ is the so-called treasury of Atreus, which may be taken as an example of the general construction. It consists of three parts: the *dromos*, a long passage which gives entrance to the *tholos*, a large domed chamber; off this room is a small tomb-chamber excavated in the rock behind. The diameter of the *tholos* is about 50 ft., and the height is also about 50 ft. Somewhat similar tombs have been found at Orchomenos, in Bœotia, and all are obviously modelled on the simplest form of hut. The famous Gate of Lions at Mycenæ also belongs to this age. The Hellenic period dates from *c.* 700 B.C. till the Rom. occupation in 146 B.C., but the greatest masterpieces seem all to have been erected between 480 B.C., the date of the battle of Salamis, and the death of Alexander in 324 B.C. Since it was to their temples that the Gks. gave their highest work, it will be well here to give a short description of the plan on which they were built. The chief hall, called the *naos*, or cell, contained the statue of the god or goddess in whose honour the temple was erected. Behind this was another smaller room—the treasury. The two were of the same width, and thus formed an oblong. There was a portico both at the front and the rear, and the whole was surrounded by a colonnade. The temple, with its colonnade, was generally raised from the ground on a stylobate of three steps. The larger temples also contained rows of columns inside to support the roof. The simple span roof was terminated at the two ends by a triangular pediment above the façade, and this was usually filled with sculpture. The earliest to be developed of the three great orders of

Gk. A. was the Doric, which, as we have seen, may possibly be traced to an Egyptian origin. In the most ancient of the temples, that of the Heræum, at Olympia, the original timber columns were all gradually replaced by stone ones, and indeed in almost every part does the Doric column show its wooden origin. It follows the usual Gk. construction, containing internally a range of eight columns on each side, of which the alternate ones are connected with the side by short walls. The columns were massive, and it is in the gradual lightening and increase of symmetry in them that the chief development is to be looked for. The temple of Athena at Corinth, generally dated 650 B.C., is equally massive, the columns again being monolithic. A little later are the temple of Selinus, in Sicily, others at the same tn. and also at Agrigentum, Pæstum, and Syracuse. At the beginning of the fifth century B.C. we have the temple of Zeus, at Olympia, peripteral hexastyle (*i.e.* surrounded by columns, the porticoes at each end having six) in plan; and the so-called Theseion, now generally recognised as the temple of Hephæstos. But the highest point, both of conception and realisation, is reached in the Parthenon, the temple on the Acropolis dedicated to Athena Parthenos (Athena the Virgin). It was commenced in 454 B.C. and completed in 438, Ictinus and Callicrates being the architects. In plan it is peripteral octastyle (*i.e.* with eight columns in each portico) and stands on a stylobate of three steps. Here are found in use the means used by the Gks. to counteract optical illusions. If the line of the shaft of a column were made absolutely straight, it would appear concave; to remedy this, the column is actually made convex. The entablature, too, was raised some inches in a gentle curve, to counteract the illusion produced by the drop of the pediment, and this required a similar rise in the stylobate. The appearance of straight and stern simplicity which the trabeate style favoured was really secured by a combination of delicate curves. The columns, too, are not equidistant, but are placed closer together at the corners of the building, thus securing an air of great strength. The propylæa, which gave access to the Acropolis were also of the Doric order, though slightly later in date than the Parthenon. The origin of the Ionic order is by no means so distinct. One of the earliest examples is the archaic temple of Diana at Ephesus, *c.* 550 B.C., and about a hundred years later comes the temple of Nikè-Apteros (wingless victory) at Athens. The internal columns of the propylæa at Athens were of the Ionic order, but the most perfect example is to be found in the Erechtheum, also on the



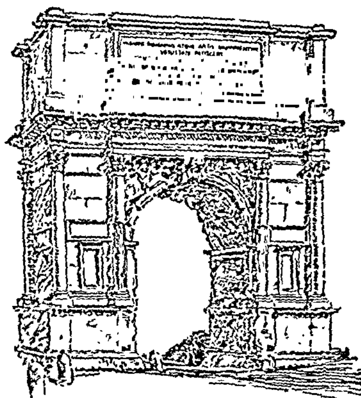
THE TEMPLE OF NIKÈ-APTEROS, ATHENS

Acropolis, N. of the Parthenon. The slope of the hill, and the fact that it occupies the site of three anct. shrines, have caused curious irregularity in the plan, which is apteral (*i.e.* with no side colonnades). It consists of two shrines, of which the eastern is dedicated to Athena Polias, and the western to Erechtheus and Poseidon. The shrine of Athena has a portico of six columns. On the N. leading to the shrine of Erechtheus is a porch with six columns (four on the N. and one at each side), and on the S.W. is the famous caryatid porch, or tribune, probably the best application of this system of columnation. The temple of Diana at Ephesus was the most important temple in Asia Minor. Its remains were excavated by the architect Wood (1869–74), and many are now in the British Museum. According to Pliny, it had a hundred columns, of which thirty-six were sculptured, and it was probably on account of the magnificence of these that the temple, which had been rebuilt by Alexander the Great, was included among the seven wonders of the world. The Corinthian order, which is more ornate than the Ionic and Doric, was a late development, and was never much in use among the Gks. The chief difference lies in the capital, which is much deeper than in the other styles, and is filled with acanthus-leaf sculpture, normally

two tiers of eight leaves surmounted by volutes springing from stalks which rise from between the leaves of the upper tier. The earliest examples, however, show a perfection which can only have been arrived at after long preparation. The Choragic monument of Lysicrates at Athens dates from 335 B.C., and the Tholos at Epidaurus is probably somewhat earlier. The first mentioned is a monument erected to Lysicrates as a reward for his success in the Choric dances. It consists of a stone base, on which is a circular marble pedestal round which are six engaged columns. The flutings are peculiar in terminating at the top in the form of leaves. In the Tholos at Epidaurus, a small circular temple, a ring of fourteen Corinthian columns is enclosed in a Doric peristyle, but only half-columns are to be found in the Philippeion at Olympia, a monument erected by Philip of Macedon, *c.* 338 B.C. Here, too, the peristyle is of another order—the Ionic. The Tower of the Winds, at Athens, so called from the sculpture on it, was erected *c.* 50 B.C. to contain a water-clock and sun-dial. It is octagonal in plan, and on two of the sides are porticoes with Corinthian columns, of which the capitals are plainer than the usual type. The most important of the Gk. Corinthian erections is the temple of Jupiter Olympius at Athens, which, though commenced 174 B.C., was not completed until A.D. 117, under Rom. influence. It has eight columns at each end, and is surrounded by a double peristyle. The capitals are the finest specimens of the Gk. Corinthian order extant.

Rome.—Broadly speaking, there are but two principles on which A. can rest—that of the arch and that of the beam. The Grecian was the last and greatest of the trabeated systems; the Rom. the first of all the arched styles. The substitution of the Rom. arch for the Gk. lintel was the greatest revolution in the history of A.; and this principle derives from the earliest inhab. of Italy, the Etruscans, who experienced the chief influence on Rom. building until the conquest of Greece and the consequent plundering of their art-treasures and the importation of their architects. The use of concrete we also owe to the Rom. The early Etruscan work was done chiefly in sun-dried brick, and so has mostly perished. Remains such as tombs, arches, bridges, and gateways show a close affinity with the Egyptian and early Pelasgic work. The Roms. at first must have followed this, but no important buildings exist before 100 B.C., when the Gk. style was already introduced. The Doric order is hardly used at all. the Ionic rarely, and on the Gk. plan. But the Roms. took up and developed the Corinthian style with vigour. Its ornateness accorded well with their ostentation and vulgarity. They also developed a composite order based on the Corinthian with the addition of an Ionic volute at each of the four corners directly under the abacus. It must be remembered, too, that the Rom. buildings were erected in all parts of the world which they conquered, and were not, as were all previous styles, confined to a comparatively small area. *Fora:* These served a variety of purposes. They were the prin. market-places and were surrounded by shops, and later by the prin. temples and public buildings. Every tn. had its forum, and that of Pompeii was especially fine. Rome had sev. fora. The oldest was the Forum Romanum, to which were afterwards added the Fora of Trajan, Julius Cæsar, Vespasian, and Nerva. Statues and triumphal arches frequently found a place in them. *Temples:* These were of two kinds, rectangular or circular, the latter kind being probably derived from Etruscan models. From the same source came the general use of the *podium*, a continuous pedestal upon which the temples were set. Access was given by a flight of steps leading to the front portico, where alone detached columns were set. The Rom. cella was much wider than the Gk., and was often filled with statues and other art treasures. The prin. rectangular temples in Rome of which remains still exist are those of Fortuna Virilis, Mars Ultor, Castor and Pollux, Vespasian, Antoninus and Faustina, Venus and Rome, and Saturn. At Nîmes is the Maison Carrée. at Spalato the temple of Æsculapius, at Baalbec the temple of Jupiter, and at Palmyra the temple of the Sun. Of circular temples the chief is the Pantheon at Rome. Others at Rome are the temples of Mater Matuta and Vesta; in the provs., the temple of Jupiter at Spalato and of Venus at Baalbec. The Pantheon, Corinthian throughout, consists of a huge domed rotunda, 142 ft. in diameter, in front of which is an octastyle portico. It is lighted by a single opening, about 30 ft. in diameter, in the centre of the dome. *Basilicas:* These were originally erected simply as courts of justice, but they soon became meeting-places where business could be transacted and where merchants could meet. They are interesting as the link between classic and Christian architecture. They were generally roofed with wood, and sometimes had

internal rows of columns. The chief are the Basilica Julia, on the Forum, one of [illegible] Basilica Ulpia, [illegible] xentius and [illegible] The great public baths are a characteristic feature of Rom. civilisation, and they were largely built by the later emperors as bribes to the people. The remains and drawings made by Palladio in the sixteenth century show the general plan. There was a large central block containing the baths proper. Around this were open spaces for athletics, and then another ring of apartments consisting of lecture halls, theatres, etc. The thermæ of Caracalla and Diocletian, both at Rome, are the largest. *Theatres and Amphitheatres:* The only theatre at Rome is that of Marcellus. The theatre of Orange (S. France) has a stage 203 ft. wide. They were generally constructed on [illegible] the cut- [illegible] t amphi- [illegible] (Rome), [illegible])omitian, [illegible] 620 ft. [illegible] *ches and* [illegible] either of a single arch, or of a large arch with a small one on each side. Of the first type are the arch of Titus (Rome),



ARCH OF TITUS

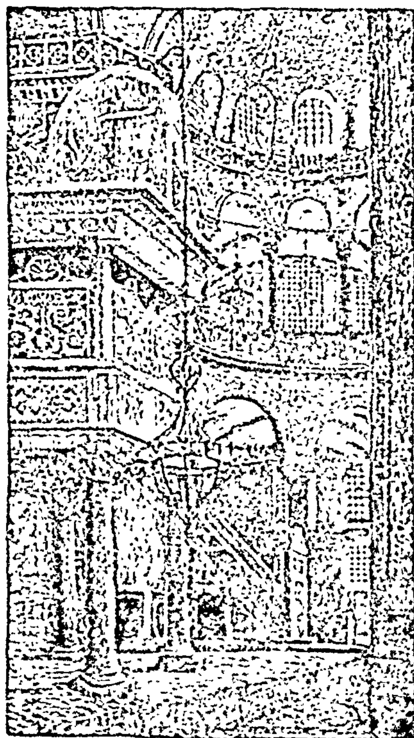
and those of Trajan at Ancona and [illegible] nd are those [illegible] Constantine [illegible] column, of the Rom. Doric order, adjoining Trajan's basilica (the Ulpia), is the chief of the columns. *Tombs:* In accordance with Etruscan custom, the Rom. tombs were numerous. They were generally monuments, and were placed at the sides of the public ways. *Palaces:* Though only ruins remain, these show that the originals must have been vast and imposing. The greatest were the palaces of the Rom. emperors on the Palatine, while in the provs. that of Diocletian at Spalato is a fine example. *Dwellings:* Ideas of the city dwellings of the Roms. can be gathered only from Pompeii and Herculaneum, and here the scale does not seem to be so magnificent as Pliny would lead us to expect. They are mostly one-storied, though we know that in Rome the houses were much higher. Hadrian's Villa, near Tivoli, is the largest of which we have remains. Its grounds occupy some 7 sq. m., and it includes theatres, gymnasia, thermæ, etc.

Early Christian.—The history of earl[illegible] date of the [illegible] 313) to the [illegible] reat is som[illegible] Christians were in the main poor people, and their churches must at first have been built in the cheapest and plainest way. Many of the pagan temples were converted into churches, but the statement that basilicas were so changed has been much controverted. Be that as it may, the general type of Christian church during the three centuries in question is distinctly on the basilican plan. The basilica consisted of a great hall divided by two rows of columns. There was an apse at each end, and in one of these was a raised platform, on which stood the magistrate's chair, and benches round the wall for his officers. In the church, the bishop occupied the place of the magistrate, the clergy the place of his officers. Instead of the eastern [illegible] und a courtyard [illegible] vered colonnade [illegible] plan, then, is a simple oblong, but sometimes slight lateral projections occur between the main hall and the apsidal end. Among the early Christian churches at Rome may be mentioned the Lateran, which has now entirely lost its anct. character, the old St. Peter's, St. Paul outside the Walls, San Clemente, and Santa Maria Maggiore. The circular temple was imitated in the baptisteries, which were then kept separate from the churches, and in the unique church of San Stefano Rotondo. This basilican A. was introduced into England, and united with the Celtic to form the A.-S. type. In Italy itself it fell with the Rom. empire, and for two centuries there is no definite style. The Romanesque style is developing. In the E., however, with Constantinople, the anct. Byzantium, for centre, a new type was rising.

Byzantine.—The political separation between E. and W. at the end of the eighth century was intensified by the theological dispute on the 'Filioque' clause in the Creed, and

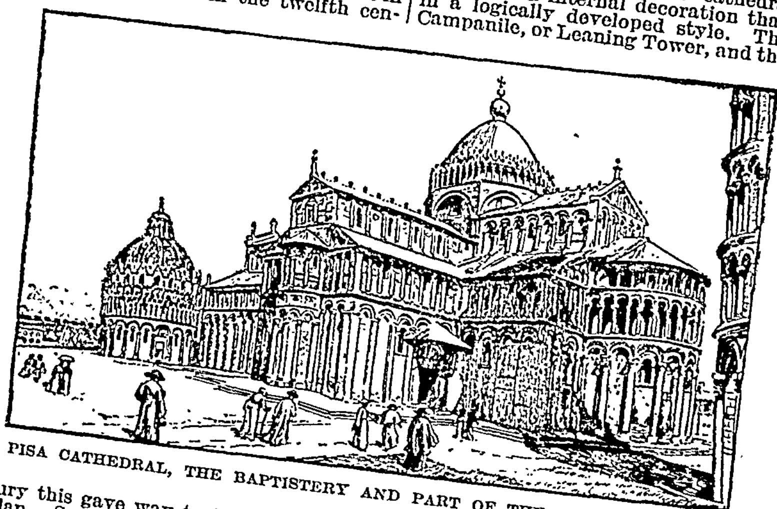

INTERIOR OF SAN CLEMENTE, ROME

this finally separated the architectural styles of the two parts of Christendom. Yet before this time there had been differences, though the line of demarcation is not clear, and these are due to the influence of eastern and Gk. architects and principles. The Byzantine style is characterised by the general use of the dome, placed, too, over square apartments, whose sides are brought to the circle by means of pendentives. Smaller domes were frequently grouped round a large central one. Churches on this type are numerous from the time of Justinian. In A.D. 527 this monarch erected the church of SS. Sergius and Bacchus, but his greatest work was the church of St. Sophia (Holy Wisdom) at Constantinople, begun in 532 and completed in 537. It shows the high-water mark of the style, and has since been the general model for churches of the Gk. orthodox communion. Further than this, imitations of St. Sophia form a distinct branch of Mohammedan A. The oval-ended nave is 265 ft. long by 107 ft. wide, and the centre is roofed by the great dome 107 ft. in diameter. To the W. of the building is the narthex, and beyond this the atrium, with colonnades as in the basilican churches. The walls were decorated with splendid mosaics and paintings which have been partially obliterated by the Mohammedans, who now possess the church, and who have made it into a mosque. Other early Byzantine churches are St. Irene, and the churches of the Theotokos and the Chora, all at Constantinople, and the church of the Holy Apostles, which, though utterly destroyed in the fifteenth century, is important as giving the plans for the church of St. Mark at Venice. Generally, the external appearance of Byzantine buildings is simple but picturesque, for all the constructional features are effective. Internally, the decoration is magnificent and highly coloured.


INTERIOR OF ST. SOPHIA, CONSTANTINOPLE

Romanesque.—The term covers the A. of the whole of W. Europe, which, growing up after the decay of the Rom. empire, continued till the rise of the pointed arch in the thirteenth century. Though there are diversities in the separate countries, the main feature throughout is the round

arch. Various methods of subdivision are employed. The question of vaulting, too, is important. At first the Rom. barrel-vault was used, but the difficulty of vaulting irregular oblique divs. and its great ugliness led to the introduction of groin vaulting and the insertion of transverse ribs which ultimately divided the space to be covered into a series of small compartments. Even in Rom. times (*e.g.* in Diocletian's palace at Spalato), the column had been allowed to bear an arch directly, instead of its being considered an inseparable part of its entablature, and this system is further developed under the Romanesque style. Since it was a development of the early Christian type, the Basilican plan was at first in general use, but in the twelfth cen-



PISA CATHEDRAL, THE BAPTISTERY AND PART OF THE LEANING TOWER

ury this gave way to the cruciform lan. Square, octagonal, and circular owers are also a feature of Romanque work. *Italian Romanesque:* ne plan of the basilica is retained, d but few improvements are made. the S., Norman and Saracenic luences are at work, and in the N., r. A strange effect is often proced in the plan by the extension the transept, which is made very e, over the nave. This is well in the church of St. Nicolo at i, where the projection is very at. The projecting porch is also a mon feature. The cathedral of reale (Sicily) shows the general an style, which is under Norman Byzantine influences. The walls ornamented with mosaics and sque borders, over slabs of white le. One of the finest examples of the A. of Central Italy is the churc of San Miniato, at Florence. It divided longitudinally into aisles, an transversely into three nearly squar divs. by clustered piers which suppor great arches. This would seem to be a sign of the coming vaulting in compartments. The eastern portion is raised some feet above the nave, and is built over a crypt which is open to the nave. The roof is of open timber, gaily painted and gilded, and a feature of the decoration is the black and white marble panelling. Pisa cathedral belongs to the same class. The transepts are now fully developed, and here have segmental apses at each end. The beauty of the cathedral lies more in internal decoration than in a logically developed style. The Campanile, or Leaning Tower, and the detached baptistery are also noteworthy. The churches of Sant' Ambrogio at Milan, and San Michele at Pavia are the two most important buildings in the N. Italy or Lombard style. Others are St. Antonio at Placenza, and St. Zenone at Verona. The campaniles, or bell towers, are peculiar to Italian art. They are always separate from their churches and have no buttresses or external ornament. They are broken only by the windows which light the staircase inside. *French Romanesque:* The disturbed state of the country during the early ages meant that no united progress could be made in building, and it is not until the time of Charlemagne that a school can be said to have arisen. Barbaric influences were also at work destroying the original Rom. form. The style developed some-

t differently in the S., where it richer and more luxuriant, and in N., where the nearest approach s made to the coming Gothic. In extreme N., the Norman style s developing. In the S., and particularly in the prov. of Aquitania, ere are a number of small churches oofed with cupolas, but the most mportant domed church is the athedral of Angoulême. It has a ong aisleless nave, and is cruciform n plan. The nave is roofed with four tone domes, and there is likewise a dome at each end of the transept. The church of Notre-Dame-la-Grande at Poitiers (Anjou) is distinguished for its richness of decoration. *German Romanesque* is frequently called *Rhenish*, for it was chiefly developed in the Rhine valley, and there its chief monuments remain. The system of vaulting was introduced much later than in the other countries, and probably the cathedrals of Spires and Mainz were the first Ger. churches where the system was carried right through, that is, about the eleventh century. The Romanesque A. also continued much later in the Rhine valley, and, in consequence, the results achieved were superior in construction even to those of France. It has, indeed, much in common with the Lombard style, and shows much less variety than the Fr., because of the restricted area over which it extended. At the monastery of St. Gall in Switzerland a manuscript was found in the eighteenth century which gives a plan for a monastery. It seems to have been prepared by Eginhard, a friend of Charlemagne, and shows a church with nave and two aisles, with an apse at each end. Around the church are to be found the abbot's lodging, public school, guest-house, dispensary, refectory, dormitory, cloisters, etc. At Cologne a number of triapsidal churches are found, the three apses taking the place of choir and transept. Such are the churches of the Holy Apostles, and St. Maria im Capitol. The great cathedrals of Worms, Mayence, Trèves, and Spires are all worthy monuments of the eleventh and twelfth-century Rhenish work. Aix-la-Chapelle Cathedral, originally built by Charlemagne, has been considerably altered in Gothic times. *Spanish Romanesque:* During the Romanesque and early Gothic periods the S. of Spain was under Moorish dominion, and the A. there was Saracenic. In the N. no great Romanesque church remains, for constant rebuilding has been in progress. San Isidoro at Leon, and San Vicente at Avila are late Romanesque, and show rich and beautiful sculpture. *Anglo-Saxon:* This period embraces all the architectural work that was done in England from the coming of Augustine until the time of Edward the Confessor, when that monarch began the building of Westminster Abbey, *novo ædificandi genere*, as William of Malmesbury tells us. It developed in England from a combination of the Celtic and Rom. elements, and so two types of churches were used, the square-ended (Celtic) and the basilican apsidal-ended. Peculiarities of the A.-S. style by which it may be distinguished from Norman are these: (1) 'Long and

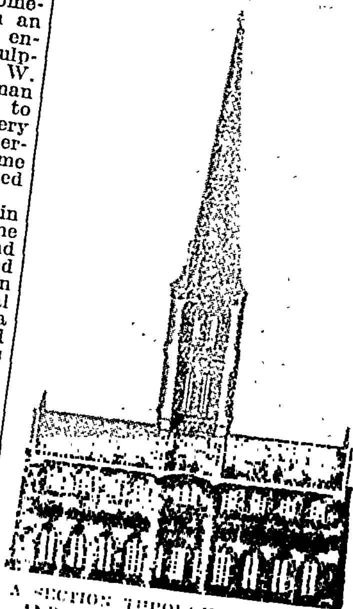


EXAMPLE OF NORMAN ARCHITECTUR[E]
(Canterbury Cathedral)

short work,' which consists of lay[ing] long blocks of stone alternat[ely] horizontally and vertically at [the] corners of buildings and in do[or] jambs; (2) occasional triangu[lar-] headed arches and doorways; (3) use of baluster shafts in windo[ws], each head being cut out of a si[ngle] stone; (4) windows with two sp[lays], the window being in the *centre* o[f the] wall, and not flush with the [outer] face; (5) Celtic scroll work car[ved]... The Saxon arch, where it exis[ts, is] always semicircular. Specime[ns of] Saxon work are to be found at ... (Northampton), Sompting ... nack (Northampton), Sompting (Sus-]sex), etc. *Norman:* This ...

second div. of Eng. Romanesque, and, as we have seen, was introduced before the Norman Conquest. It prevailed to the time of Henry II., when a period of transition set in, and the style began to approximate to the Gothic type known as Early Eng. The pillars are generally low and massive, the arches heavy and round-headed. The capitals are large and with square abacus, the windows small and narrow with semicircular heads. The ordinary plan of the Norman church was cruciform with a low tower rising at the intersection of the nave and choir with the transept. Sometimes there are aisles, and sometimes the E. end terminates in an apse. Doorways are frequently enriched with much carving and sculpture, a fine example being the W. porch at Lincoln Cathedral. Norman architects were much attached to arcades as wall decorations. Very frequently these are made to intersect, and this is believed by some writers to be the origin of the pointed arch.

Gothic.—Almost simultaneously in France and England a change came over the spirit of the A. about the end of the twelfth century. The pointed arch, which had already appeared in isolated examples, comes into general use, and from this beginning came a radical change which can be summed up in a sentence. In previous styles the chief line was the horizontal, in Gothic it was the vertical. As the style de... [illegible] ...re came, too, a [illegible] As the stately [illegible] ...ed up to heaven they seem to have partially lost their earthly nature, to have become spiritualised and hallowed for their sacred purposes. The spirit of Gothic A. is in the truest sense the spirit of the middle ages, the spirit of faith and whole-hearted striving after God. The development proceeded on much ...he same lines throughout Europe, ...ut it will be wise to deal with it in ...ngland somewhat more in detail. ...ere it is usually divided into the ...arly English (1200–75). Decorated ...300–75), Perpendicular (1400–1575). ...etween each division a transitional ...riod of about twenty-five years ...ervenes, and it must be remem...red that these dates are only ...proximate. *Early English*: It has ...n said that Eng. Gothic art first ...ang into being in the choir at Lin..., under the inspiration of Bishop ...Hugh, and it was soon followed by ...presbytery at Westminster. Yet ...he first quarter of the thirteenth ...ury, during the miserable reign of ..., little other work was produced. ... came a triumphant burst of ...ch-building. The glorious cathedral of Salisbury was built throug... out, and in the rest of the count... there are few mighty minsters ... parish churches that have not som... evidences of Early Eng. art. Th... N. transept of York Minster, the nav... and stately W. front of Wells, th... choirs of Southwell and Beverley, Glasgow Cathedral, the W. front o... Ripon, the nine altars at Durham, the Galilee of Ely, the W. end of St. Albans, are only a few of the noble creations of this period. Salisbury



A SECTION THROUGH THE TOWER AND TRANSEPTS OF SALISBURY CATHEDRAL

Cathedral is the most perfect example of Early Eng., for it was erected with no previous Norman structure to hamper the plan, which is that of a double cross, and there is a noble central tower and spire. The nave is long and narrow, with piers composed of clustered columns of Purbeck marble and detached marble shafts, surmounted by a triforium with trefoiled arches and a clerestory with double lancet windows. At the E. end is a lady chapel, extended behind the high altar. The chief peculiarities of this style are the pointed arches, piers composed of insulated cylindrical columns surrounded by

slender detached shafts, dog-tooth ornament, lancet windows, and a peculiar bell-shaped capital with stiff-leaved foliage. *Decorated:* This is the highest development of Gothic A. in England, the summit which had to be followed by decline. This stiff-leaved sculpture became more natural. New forms of expression were found. Yet the fourteenth century brought with it much elaborateness, and this developed into an extravagance of idea and execution which destroyed the simplicity of the early work. There was a love, too, of width and openness as well as of height. Windows are made wider, and the arches are wider spaced. The naves, too, are made less long and narrow. The tracery of the windows becomes almost a separate department, and bewildering beauty and variety are found. During the early part of the century, the tracery is largely geometrical, composed of figures such as circles and trefoils, but, as the style advances, it becomes flowing and reticulate. Famous windows of this period are the W. window at Exeter, the E. at Carlisle, the W. of York, and the E. of Lincoln. In large churches the triforium story is now omitted and the clerestory windows are increased in size. Another feature of the Decorated style is the form of piers, composed of four or more semi-cylindrical piers, not detached, but united without any band. Roll-mouldings are common, and the ball-flower ornament is peculiar. The bell-shaped capital is retained, but the foliage is elaborate and the lines are natural. *Perpendicular:* While on the Continent the A. was degenerating into the Flamboyant (so called from the flame-like waves of the window tracery), in England it developed into the Florid or Perpendicular. Perhaps the earliest sign of change is observable in Gloucester Cathedral, where we see the panel-work and the large windows with their straight-lined tracery. It is from this peculiarity that the style derives its name. The mullions are now vertical, carried straight up through the head of the window, and not branching out in curved or flowing lines as in those of the previous style. The windows are still larger, and afford the glass-painter a greater field for his picture-work. The large lights are frequently divided by transoms which form a series of lower compartments resembling panelling. It is needless to give examples of these developments, for almost every old church and cathedral of the country exemplifies most of them. The triforium is now quite abandoned, and the general form of the piers is octagonal with polygonal base mouldings. The roofs are flatter, and the mouldings in particular show the degeneracy of the workmen, due partly to the Black Death. They are shallow and hard, a favourite being the cavetto, with a four-petalled flower something like the ball-flower. Fan-tracery is also developed—a form of vaulting which is composed of pendent semi-cones covered with foliated panel-work. A good example is in Henry VIII.'s Chapel, Westminster. Throughout the vaulting is intricate and peculiar. *Italian Gothic:* The influence of the old Rom. forms naturally continued far longer in Italy than in the rest of Europe. The Romanesque here was more classical, and the churches regularly retained the old basilican plan. In the same way, Gothic never became one of the true It. styles; the Romanesque continued late and the Renaissance came early. The sculptures are better than in the northern countries, but are less symbolical. Colour is freely used, for the marbles of N. and Central Italy supplied abundant material. The use of brick is another feature of the It. work, for there were large parts of the country where no stone could be obtained. Milan Cathedral is the most important Gothic work in the country, and this is definitely under Ger. influence. It was commenced in 1385 by the first Duke of Milan, and consecrated in 1418. It is the greatest in size of the mediæval cathedrals with the exception of Seville. In material it is the richest, being constructed throughout in white marble, and the decoration is most gorgeous. Externally it is covered with bewildering tracery, a mass of pinnacles, spires and statuary glittering in white. Yet, with all this, the building cannot compare favourably with any of the great northern cathedrals. The true Gothic conceptions of the Ger. architect prevailed only in the details, and the plan and general appearance are clumsy. In plan it consists of a nave with two small clerestories. There are four rows of columns, giving two aisles on each side, and the nave terminates in a Fr. circlet of columns, enclosed in a Ger. polygonal end. The result is a compromise between the Fr. *chevet* and the Ger. or It. apse. Over the central part of the nave is a vault crowned with a lofty spire erected in 1440 by Brunelleschi. Thanks to the architect, the columns are placed much closer together than in most It. work, and the ugly pseudo-Classic capitals are replaced by niches filled with statuary. But It. Gothic improved more rapidly in the secular than in the religious buildings, and a particularly good example of civic art is to be found at Venice,

the great merchant city of the middle ages, wealthy and powerful. The Doges' Palace or Ducal Palace was erected in the fourteenth century, but the western face was burnt down, and later rebuilt in imitation of the rest of the building. Each façade consists of an open arcade of two stories, and the carving of the capitals is justly famous. The cathedral at Florence shows the wide spacing of the nave arcades already referred to. It was commenced in 1294, but it was not till 1420 that the dome was added. The ground plan is magnificent. A vast nave leads to an enormous octagonal dome, and this is finished by

monastic. The four great cathedral of France are those of Paris, Amiens Chartres, and Rheims, and of the four that of Paris is the oldest. It was commenced in 1163, and completed in 1214. The plan consists of a wide nave, with double aisles which are carried round the *chevet* end, peculiar to Fr. buildings. The transepts have hardly any projection at all over the side aisles. The W. front consists of two huge towers forming the grandest of cathedral façades. The insertion of chapels has spoilt the buttresses. Amiens Cathedral is generally considered as the most typically Fr. in plan, and so is often used for com-

..., PARIS

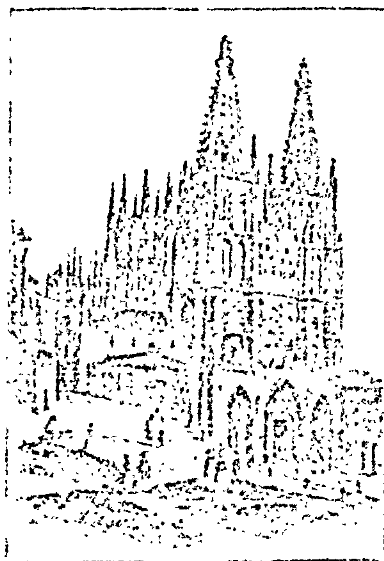
he triapsal end so common at ologne. It is in the imperfect proortion of the separate parts, and pecially in the size of the nave ches, that the cathedral fails. *rench Gothic:* In the S. of France othic art never reached the heights attained in the N., and it is in rmandy and the Ile-de-France t the best work was done. The in principles were the same as in er parts of Europe, but the Fr. entuated the vertical lines by ng their buildings great internal ht, by the extensive use of spires, acles, and flying buttresses. The t cathedral-building age was the half of the thirteenth century, this synchronises with an out- of crusading zeal. The laity the greater part of the expense, he buildings were not primarily

parison with Salisbury as a typical Eng. building. The plan is fundamentally the same as at Notre Dame (Paris), but the transepts project further and the *chevet* end has a number of small apses. The enormous height of the interior detracts from the effect of the exterior. The two western towers, which make the façade similar to that of Paris, though taller than those of York, are dwarfed by the huge roof behind them. The spire suffers from the same cause, though it is taller than Salisbury spire. Chartres Cathedral is more irregular in plan than the other two, and its transepts are more strongly marked. There is only a single aisle on each side of the nave, and the width is too great in proportion to the height. The two spires at the W. end are the finest of their kind in France. The

southern one is plain, but excellently designed, and the northern is of great richness. The original intention was to have erected eight towers, one on each side of the choir, two at the E., two at the W., and one at the end of each transept, but only the western two have been completed. The façade at Rheims is very similar to those at Paris and Amiens, but a row of statues takes the place of the open tracery of Notre Dame. The absence of the side chapels so often added to the original plan improves the nave, and a wonderful effect is produced by the broadening out of the choir to the width of the transepts. The civic buildings, palaces, and castles of the time form a distinct class, but it is impossible to treat them here. The most famous dwelling-house of the middle ages is that of Jacques Cœur at Bourges. All that remains of the royal palace at Paris is the Sainte Chapelle, a Gothic building which shows the huge windows of the N.

German Gothic: We have already seen that the Romanesque style continued in use much later among the Gers. than among the rest of the builders of Europe, and when, at the end of the thirteenth century, the Gothic style appears, it is not a development, but a foreign importation. Cologne is the great cathedral of Germany in which all its virtues are summed up. It is built on the plan of Amiens, but the aisles have been made double, one bay has been taken off the nave, and one added to the transept. It is the largest cathedral of N. Europe, covering an area of 91,464 sq. ft. The length is 468 ft. and the width 275 ft., but the actual width of the nave between the pillars is 41 ft. 6 in., whereas the height is 155 ft. This proportion hopelessly dwarfs everything in the building, and the relative shortness spoils both the internal and the external effect. Everything else is designed with such mechanical correctness that the poetry which is the charm of the Fr. cathedrals seems entirely crushed out. This applies with particular force to the spires, which at the western façade rise to a height of 510 ft. The open work in the spires, characteristic of Ger. Gothic, is here carried to an extreme. Many have thought that the dignity of the spires is detracted from by the profusion of tracery, and in this respect Freiburg Cathedral, with its smaller spire, is finer. A still more splendid spire, with less open tracery, is to be found at St. Stephens, Vienna. This church is singular in having no clerestory or triforium, and in having the three aisles nearly equal both in width and in height. Secular A. is again important, and many fine castles, town-halls, and gateways date from these centuries.

Spanish Gothic: The Spaniards never succeeded in developing a national type of A. for themselves, but regularly borrowed from other countries. The predominating influence was Fr., though this was later replaced by Ger. and It. At all times the Saracenic influence of the S. is apparent. Toledo Cathedral shows one peculiarly Sp. feature—the intrusion of the choir into the nave, *i.e.* its situation to the W. of the crossing or transept. It shares with Cologne the defect of excessive shortness, but here it is partly remedied by decreasing the height. In plan it is five-aisled, with apsidal end. But the greatest cathedral of Spain and the largest mediæval cathedral of any country is that of Seville. The structure is peculiar, and the plan is quite un-Gothic, for the cathedral was erected on the site of a mosque, the outline of



BURGOS CATHEDRAL

An example of florid Gothic Architecture in Spain

which it followed. It is rectangular, with a nave and double aisles, and follows the usual Sp. arrangement for the choir. The nave is 55 ft. wide, and each of the aisles spans 40 ft., the total width being [illegible] ft.

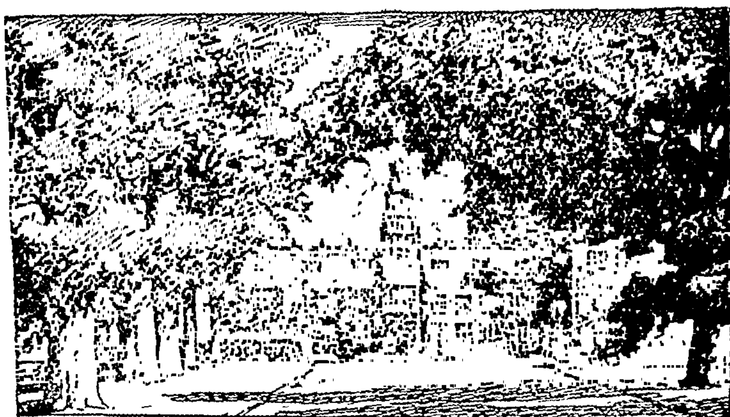
Belgian and Dutch Gothic: Wedged in, as they are, between Germany and France, these two countries partake of the nature of their neighbours. The Belgian A. is Fr. with a slight admixture of Ger., while Holland is

chiefly affected by Germany. Neither country retains much trace of Romanesque work. The finest cathedral is that of Tournai, the nave of which is Romanesque, while the transept, with apsidal ends, was added in the twelfth century in a transition style. In the fourteenth century the old choir was taken down and a new one with *chevet* end built in fully-developed Gothic style. Other interesting churches are the cathedrals of Brussels, Antwerp, and Bruges. In secular work the building of town-halls, chief of which are those of Brussels, Bruges, Louvain, and Ghent, was carried to its greatest height.

The Renaissance.—The movement known as the Renaissance, or 'New Birth,' arose in Italy in the early part of the fifteenth century, though its harbingers are to be seen during the century before. Its causes were many and various, and its influence may be traced in all the arts and not less in religion. Classic literature may almost be said to have been re-discovered. Gk. scholars from the E. seem to have foreseen the approach of the fall of Constantinople, the cap. of the Eastern empire, and to have migrated westward. When in 1453 the fall actually came, a general exodus took place. But the return to classical forms is found in every dept. of art, and in A. it was hastened by the discovery of an architectural treatise by Vitruvius, a Lat. author of the first century B.C. This gave rules for building and the proportions for columns, etc.; but since Vitruvius himself had never visited Greece, and was only acquainted with Rom. examples, these were often incorrect. The book possessed no illustrations, so in Italy itself the lack of these was supplied by the inspection of those monuments of the empire which still remained. Italy was, of course, the centre of the new movement, whence it spread over the whole of W. Europe. The main features in the style were the Classic orders, the four Rom. orders being used with the addition of a fifth, the Tuscan, which was a debased Doric form. Yet the style was not entirely imitative, and it was in Italy itself that the greatest freedom was used. The architects were artists before all, and the abundance of old Rom. work about them enabled them to dispense to a great extent with the authority of Vitruvius, which became somewhat too despotic in the rest of Europe. Generally, although important types of church design were developed, the chief energies of the time were devoted to the evolution of a civic style. *Italian Renaissance:* Three schools may be broadly distinguished in this country, the div. being largely due to social and political causes. By this time the personality of the architect becomes the main factor in the work, whereas in the Gothic buildings the result was achieved by the perfect harmony of many minds working on traditional methods. The *Florentine school* produced the great Brunelleschi (1377–1446), who may be considered as the leader of the movement. His prin. work was the dome of Florence Cathedral, to which reference has already been made. Brunelleschi was associated with Michelozzo in the great secular edifice of Florence, the Riccardi Palace, notable not only for its size, but also for the enormous blocks of rusticated masonry of the lower part, which give an air of great ruggedness and solidity. The other great Florentine architect was Leon Battista Alberti, whose writings on the subject had great influence. His largest work is the church of St. Andrea at Mantua, where the front is on the model of a Rom. triumphal arch. The *Rom. school* owes its development largely to the patronage of the popes, whose return from Avignon had taken place at the end of the fourteenth century. The first great Rom. architect was Bramante, and it was he to whom the designing of St. Peter's at Rome was originally given. Sangallo, Raphael, and Peruzzi followed him, and finally Michelangelo took up the work. The original plan was a Gk. cross, but the addition of three more eastward bays to the nave has practically made it a Lat. cross. The bays of the nave are of immense size, and over the central crossing towers the enormous dome, 140 ft. in diameter. The interior has gigantic pillars of the Corinthian order, over 100 ft. high, crowned with barrel-vaults of the old type. To the W. is the noblest courtyard in Europe. The Rom. palaces gain much by their simplicity. The *Venetian school* evolved somewhat differently from the other two, partly because of its greater distance from Rome, and partly because it already had a Gothic style of its own, which continued in use till near the end of the fifteenth century. Between the two periods is to be seen one of transition, where Renaissance detail only is used. Examples of this are to be found in most of the palaces. Venetian work is generally graceful and light. The library of St. Mark, erected by Sansovino and completed by Scamozzi, is the greatest work in this style. The façade consists of a lower open arcade with Doric columns, over which is a glazed arcade of Ionic columns. The whole is surmounted by an entablature

spoilt by disproportionate size. The greatest eccles. work was S. Maria dei Miracoli by Pietro Lombardo. *French Renaissance:* The invasions of Italy by Charles VIII. and Francis I. hastened the dispersion of the It. ideas, and led to the general introduction of It. workmen, whose influence on detail is immediately noticeable. Where It. workmanship is absent, the Flamboyant, or decadent Gothic, is to be found holding uninterrupted sway. In the Château de Blois, erected by Louis XII. and Francis I., the transition is to be seen. A more typical example of the ordinary Fr. castle of the time is that of Bury, near Blois, in the centre is a large courtyard with buildings on three sides. The fourth side is closed with a wall, in the middle of which is the entrance. The side opposite to this forms the main body of the building, the other two sides containing servants' rooms, stabling, etc. Beyond the main body is the garden, and at each corner of the large square is a tower. At the palace of Fontainebleau the chief interest lies in the magnificent adornments of the interiors. The greatest secular work of the Renaissance in France is the Louvre at Paris, and, since its construction was continued from the time of Francis I. to that of Louis XIV., it contains an almost complete history of the progress of the style. The building is arranged round a courtyard, 400 ft. square, but the first architect, Pierre Lescot, had intended a courtyard only one-fourth of that size. Two orders of columns are used, the lower Corinthian and the Upper Composite, and a number of pilasters adorn a third attic story. The Tuileries Palace, at Paris, is quite near to the Louvre, and is built in the same style. The difficulty of connecting the two took some years to solve. Fr. eccles. A. first shows the It. influence in tombs, pulpits, altars, and then in additions to churches. It never became so important as the secular, though some important churches employed it. The church of S. Eustache at Paris is structurally Gothic, but all the details are Renaissance, and the same remark applies to S. Etienne du Mont, though here the Gothic element is stronger. The Panthéon and the Madeleine are examples of true Renaissance work. The former was originally intended as the church of S. Geneviève, patron Saint of Paris, but its aim was changed during the Revolution, and though the building has been reconsecrated on two occasions, it is now estab. as a burying-place for the famous dead of the nation. It has a triple dome, and the columns used are Corinthian. The plan is a Gk. cross. *German Renaissance* was introduced from France about the middle of the sixteenth century, and here again it combined with the last phase of Gothic to form a transition period. The A. is almost entirely secular, for hardly any new churches were erected during or after the Reformation period. The Gers. seem to have given their chief attention to the ornament, of which the gable-ends generally receive a large share. This is characterised by grotesqueness and distorted quaintness, which, though generally crude and without refinement, are often very picturesque. Heidelberg Castle is the best-known work, and it suffers considerably from this fault of over-ornamentation. The style seems half-way between the more refined Fr. which it copied and the heavy Elizabethan Eng. At Cologne, the Rathhaus has a Renaissance porch, showing traces of Gothic. The pillars are Corinthian, but the arches are slightly pointed. It is, perhaps, the most pleasing production of the period in Germany. Among very late secular work may be mentioned the Brandenburg gate at Berlin, and the only churches to be mentioned are S. Michael, Munich, and the Frauenkirche, Dresden. *Spanish Renaissance:* Except for the Moorish influences, the style here is almost the same as that of France, and followed the usual development, in first becoming more classical and then falling away into a Rococo style. It was, if possible, richer here than in any part of Europe, for Spain naturally loves display, and she was then at the height of her power. Secular examples are many, and stretch over the whole of the three centuries during which Renaissance A. existed, and whereas in France the best examples are to be found in châteaux and mansions scattered throughout the country, in Spain the towns received most of the buildings, many of which were universities and monasteries. The earliest known work is Charles V.'s palace, commenced in 1527, and erected at Granada, near to the Alhambra. The building is an exact square, 205 ft. each way, and encloses an open circular court 100 ft. in diameter which was surrounded by an open colonnade in two stories, the lower columns being Doric and the upper Ionic. The palace of the Escurial, near Madrid, is chiefly famous for its immense size, for it comprises palace, monastery, college, and church all in one plan. The grand entrance leads into a central courtyard, with the college on the right, the monastery on the left, the ch[illegible]imme-

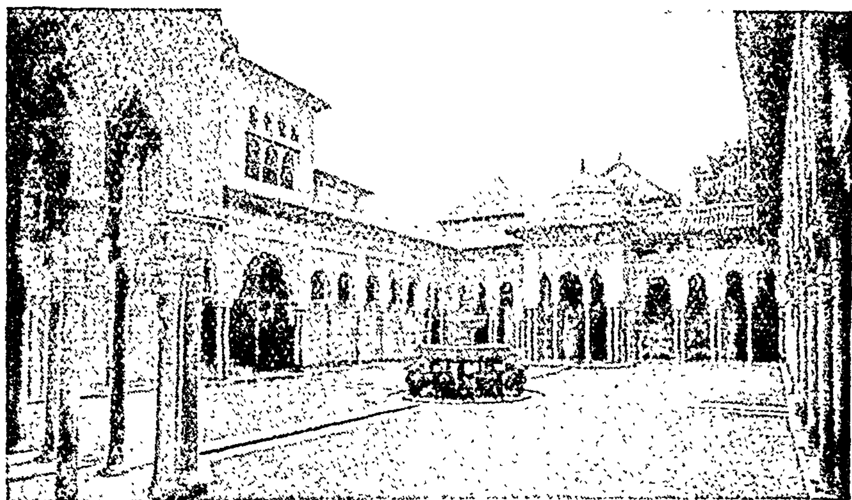
diately opposite, with the palace behind. Among the eccles. edifices of the time may be named the dome of Burgos Cathedral, Granada Cathedral, and Valladolid Cathedral, in all of which the greatest amount of work has been lavished on the magnificent portals. *Belgian and Dutch Renaissance:* The most notable example occurs towards the end of the sixteenth century, and it was not before that time that the style began to be much in use. The remarkable development in Gothic for the erection of town-halls hindered the introduction of anything new. The town-hall at Antwerp is the characteristic work. It was designed by De Vriendt in 1565, and owes its origin directly to the wealth and prosperity of the great seaport and trading centre. The length of the façade is 300 ft., and the height is divided into four storeys, the lower one being composed of a deep arcade. The design is extremely plain, the chief ornament being in the centre, where detached columns are placed before each window, and a pediment crowns the whole. It is hardly necessary to notice eccles. work, the prin. church being that of S. Anne at Bruges.
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A. shows
endicular
Gothic, of which many features are retained. The chief examples of this style are the country-houses, many of which still remain, and the Elizabethan colleges at Oxford and Cambridge, such as Jesus and Wadham at the former and Emmanuel at the latter. Special features in the country-houses are the great hall, the broad oak staircase, and the long gallery on the upper floor. The Elizabethan developed naturally into the Jacobean style by the gradual dropping of Gothic details. Then in the seventeenth century came the true Anglo-Classic style, of which the chief heads were the architects Inigo Jones and Sir Christopher Wren. Inigo Jones, the favourite of James I. and Charles I., had been familiarised with classical models by a long stay in Italy, and his genius would doubtless have shown itself more clearly had not the Commonwealth intervened. *His* banqueting-hall, at Whitehall, is all that was erected of the royal palace which was one of the most magnificent conceptions of the Renaissance. Scope was given to Wren's genius by the Great Fire, which offered him a unique sphere of work. His prin. work is St. Paul's in London of which the plan and execution are too well known to need much description. The plan is of the original mediæval type, and the internal columns



HATFIELD HOUSE
An example of English Renaissance Style

are Corinthian. The base of the dome has a diameter of 109 ft. Externally it is one of the finest in Europe. Wren was also the architect of about fifty city churches, and many secular buildings, such as Chelsea Hospital, part of Greenwich Hospital, and the Temple, London. During the next two centuries the classical style became more and more used for general purposes, under a succession of architects whose names are well known. Nicholas Hawksmoor was a pupil of Wren, and was a contemporary of Sir John Vanbrugh (1666–1726), in conjunction with whom he worked in the designing of Blenheim Palace, distinguished chiefly by the striving after symmetry and monumental grandeur which caused the debasement of A. Other names are those of James Gibbs, the brothers Adam and James Wyatt, Sir John Soane, and Sir William Chambers. The last-named was the architect of Somerset House, London, which is grand, simple, and dignified throughout. Soane was the architect of the Bank of England. Before dealing shortly with the question of present-day A., one other style remains of which mention has already been made in connection with Spain.

Mohammedan architecture, sometimes termed Saracenic, extended everywhere with the Mohammedan religion, for it is a religious rather than a national growth, though in the various nations it differs widely in treatment and detail. The religion prescribed the plan of the mosques, and these were the principal edifices of the earlier work. The typical mosque consists of an open courtyard surrounded by a colonnade, which is deepest on the side towards Mecca and opposite the entrance. Somewhere near the entrance is the minaret, from which the muezzin calls the faithful to prayer. Another type of mosque is founded on the Byzantine church plan, and especially on the church of S. Sophia, which is now a mosque. Decoration is mostly geometrical, for the use of all natural objects is prohibited. Mohammedan A. is generally subdivided according to the various nations where the 'Saracens' have settled, *i.e.* into Arabian, Syrian, Egyptian, Spanish, Persian, Turkish, and Indian, and these naturally vary in importance. The Sp. may be mentioned particularly because it includes the best-known Mohammedan palace in Europe. The Alhambra, Granada, the most renowned of all Saracenic erections, dates almost entirely from the early fourteenth century. It consists of two oblong courts, of which the earlier, the Court of the Lions, is the more elaborate. It measures 115 ft. by 66 ft., and has been described as 'the gem of the Arabian art in Spain.' Other buildings which may be mentioned are the mosque of Cordova, the Sulimaniyeh in Turkey, and the mosque of Kait-Bey near Cairo. The chief feature of Mohammedan work is, as has been said, the geometrical tracery, often of a most intricate kind, and other features are the tall graceful minarets, the various pointed, horse-shoe, multifoil, and ogee arches, and the pear-shaped eastern domes.


THE COURT OF THE LIONS, ALHAMBRA, GRANADA

Modern architecture.—From time

immemorial almost, the materials of building had remained practically the same and identical all over the world: mud, wood, wattle, brick and stone. Similarly, the styles of building have a long evolutionary history with affinities due partly to the nature of the materials employed, but in part also to evolutionary development. In Europe there were thus for the last three or four hundred years only two styles in A. as distinct from local traditional building—namely, the Gothic and the classical. Upon these two styles the architects, academically trained, had rung the changes by modifications, adaptations, combinations, none of which, however, resulted in the creation of a new style. At the commencement of the twentieth century, however, prompted in part by the preaching of Ruskin and the precept of William Morris, a certain craving for 'honesty' and 'simplicity' began to make itself felt: a desire to let the building materials assert themselves as such: honest brickwork, not stucco pretence, for example, and honest woodwork, especially in interior decoration and furniture, instead of gilding, painting, and veneer. Amongst the pioneers of this movement were the architects C. R. Ashbee in England and C. R. Mackintosh in Scotland. For whilst these tendencies brought about some changes, they did not in themselves constitute a radically new departure. This new departure, however, was made, again in England, as far back as 1850 when Mr.—later Sir—Joseph Paxton (1801–65) designed the building of the Great Exhibition in Hyde Park, re-erected as the Crystal Palace at Sydenham in 1853–54. The Crystal Palace is a structure of iron and glass, an entirely new combination of building materials, and one moreover that depends for its existence on an industrial basis such as had theretofore never existed. The material, the form, and the area of this huge structure are in style unlike any A. that had preceded it. Actually it is nothing more nor less than a huge conservatory, Paxton was not only an architect, but also a gardener. The building is 1608 ft. long; of its two transepts one stands 175 ft. from the floor, and its two water-towers are 282 ft. high; in them the first lifts were installed; the area of the whole structure covers 503,072 sq. ft. Thus the Crystal Palace tackled architectural problems which in many ways anticipate the problems the modern engineer-builder has to solve; but which in no way resemble those of the traditional architect. Truly *modern* building is, in fact, a form of engineering, and depends pre-eminently on the machine and its building products, iron, glass and reinforced concrete. This latter material was invented by François Coignet in 1861, but did not come into general use until thirty or forty years later. The next great landmark of modern A. is again an engineer's construction—namely, the Eiffel Tower, built by Alexandre Gustave Eiffel in the Champ de Mars in Paris in 1889. It is 984 ft. high and consists entirely of interlaced ironwork. Eiffel dealt with the vertical problems of modern building and its lofty construction anticipated what has become a *sine qua non* of the modern sky-scraper. 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Whilst this principle is, to say the least, doubtful, it cannot be denied that the A. based upon it is often entirely unprecedented in its forms and occasionally impressive in its appearance. Characteristic of this new A. is its entire disregard for, or, better expressed, its independence of the traditional forms of æsthetics due to the totally different method of construction and the predominance of economical considerations which are ethically justified by the pretence that ornament as such is 'romantic' and irrelevant. In the earlier U.S.A. sky-scrapers such as the Woolworth building, 792 ft. high (architect Gilbert) or the Standard Oil Building (architects, Carrère and Hastings) irrelevant Gothic and classical elements were still precariously if conspicuously associated with the steel frame; in more recent constructions, such as the Graybar Building (architects, Sloan and Robertson), all ornament has disappeared: and A. has resolved itself into an erection of superimposed cubic forms, but with a swift advance to even more

striking and dignified types. (See below.) These cubic forms are also associated with the new A. of small dwelling-houses built of reinforced concrete, of which Le Corbusier and André Lurçat are the foremost exponents. Here we have, instead of the vertical arrangement of 'voids'—that is, openings in the façade of the building—a horizontal arrangement. A combination of the vertical with the horizontal arrangement of voids may be seen in the New Olympia Building (architect, Embleton). Further developments of the new A. are the cubes of the 'Rue Mallet Stevens' in Paris named after their A. and which with their flat roofs give the quarter an almost oriental appearance, not aimed at, but the result of modern economical construction. The over-emphasis of uninterrupted horizontals gives the sensation of an endless solid, not resting, but travelling upon voids. Such is the case especially with continental architects, whose new flats and business buildings seem destitute of æsthetic logic, which demands a visible support for every horizontal. It is a sense of movement, of dynamic rather than static qualities, which often gives this new A., of which perhaps Bruno Taut and Erick Mendelssohn in Germany are the principal exponents, the appearance almost of ship decks of modern men-o'-war. By far the most interesting and æsthetically satisfying results these new constructional principles have evolved are to be found in some typically modern purposes, such as hangars, radio stations, and factories of different kinds. Of such may be mentioned the radio station at Ketwejck in Holland, the hangar for dirigible airships at Orcy (architect Freyssinet), the cabinet factory of the Gramophone Company at Hayes (architects, Wallis Gilbert and partners), the grain elevators at Montreal, Canada, the refuse converter at Cologne (architect, Mehrtens, Cologne), etc. Efforts to give dignity to these modern principles, in cases where more than practical use is of importance, have, so far at all events, hardly succeeded. One of the best efforts in this respect is the new Horticultural Hall, Westminster (architects, Easton & Robertson), which, though devoid of ornament, has, by reason of the arrangement and proportions of the structural members, especially in its interior, a decidedly pleasing æsthetical effect. More daring are the efforts made by the Fr. architects A. and G. Perret and the Swiss architect Karl Moser of Zurich, with a view to imparting to ferro-concrete and glass the dignity of the old stone-built churches. Messrs. Perret's Church of St. Thérèse de l'Enfant Jésus at Montmagny has for walls a kind of patterned and pierced screens or *grilles*, and makes, both outside and inside, a vaguely Gothic, but 'meagre' impression. Karl Moser's Church of St. Antonius at Bâle still suggests a factory building with a chimney rather than a tower. That there is now quite definitely, and owing to similar economical pressure all over the world, an international style of engineer-A. in the making there can be no doubt; but until economical considerations, such as the standardisation of the material demanded by its machine production, and other time, money and labour-saving factors which are now regarded as of *primary* importance, are put into their proper subservient place a new style of pure A. is hardly to be expected.

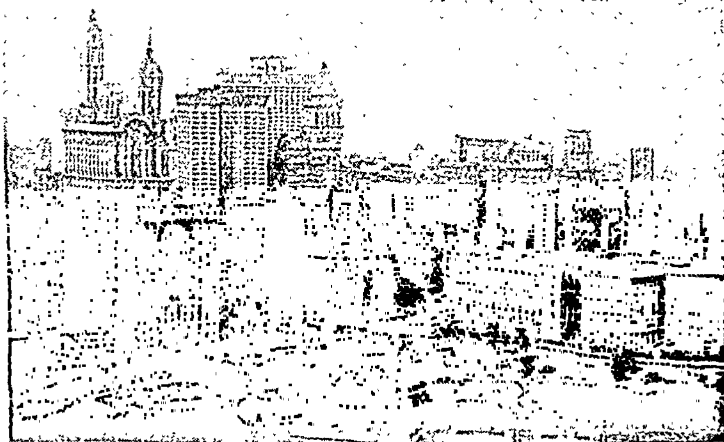
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in a lofty central tower which shoots up from a large rectangular base, the principle of classic detail being modified by touches of Romanesque sentiment. It is significant, however, that the classic element is in detail only. Yet the American attitude towards A., contrary to current British views on America, is essentially conservative, an attitude primarily explained by her classic training; a training exemplified by the influence of Robert Adam, the Romanesque revival of Thomas Jefferson. [illegible] the World's [illegible] at Chicago, [illegible]mic brilliance [illegible] and White. The Church of St. Thomas, Fifth Avenue, the Savoy Plaza Hotel, and the Bowery Bank, New York, are examples showing that Gothic, Classic and Romanesque respectively can be incorporated into modern A. with progressive freedom. The ornate mass of the offices of the New York Life Insurance Company (Cass Gilbert), on the site of Madison Square Garden, is Gothic; the lofty Woolworth Building, in New York, is generally [illegible] Gothic, [illegible] yet in these cases the Gothic element is somewhat slight and subordinate to the utilitarian application of archæological features. There is genuine beauty in such classic buildings as the Cunard Building, New York, the Stevens Hotel, San Francisco, and the Pacific Oil and Electric Company's building, also in San Francisco; but it is obvious in America that the Classic style of McKinn, Mead and White is disappearing; the Romanesque influence of H. H. Richardson is also doomed; and even Stanford White is a past name. The old forms are yielding to a school of A. in which form is increasingly functional and national, and decoration governed by the form it decorates, *e.g.* in the Chanin Building (Sloan and Robertson), a 'set-back' skyscraper building, near the bottom of the rectangular base of which is a frieze of enormous foliage treated conventionally, though somewhat out of scale with the brick piers above and the more successful ornamental bronze band below. Suitability to environment is the keynote to progressive development in the U.S.A. Compromise between plan and function is [illegible] conflict is exem- [illegible] with hanging columns, or buildings like the Union Station at Cleveland. Among some of the most typical American skyscrapers which illustrate the rapid development of American A., combining all sections or departments of vast undertakings in a well co-ordinated unity, are the Park Avenue Building, New York, and the Hollywood Storage Company's Warehouse. In these the old style of piling up the orders has completely disappeared; the later style in which upper and lower floors are contained in an order bearing no relation to the floors behind the façade, is also absent; the most modern design


U.S. Army Air Corps

NEW YORK SKYSCRAPERS

being to adopt the windows and walls themselves as the unit of scale applied to the whole building, a logical treatment which is a great improvement in style. The 'step back' style is the necessary result of the zoning laws, and has done much to improve design and lend perspective in congested areas. Some of the best recent types are the Barclay-Vesey Building, New York; the Radiator Building, New York; the Fisher Building (Albert Kahn), in Detroit, an enormous yet rhythmically planned and finely massed edifice, full of colour and wealth of material; the City Hall (Austin, Parkinson and Martin), Los Angeles; the Graybar Building, New York; the Park Avenue Building, New York; the Skelton Hotel; the Chanin Building, New York; No. 333, Michigan Avenue, Chicago; and the Pacific Telephone Company's Building, San Francisco. Of great significance to modern A., in America, too, are the massive cathedrals in Washington and New York, which are being slowly completed, probably the two finest modern examples of their kind. The Princeton University Chapel (Cram and Ferguson who are the architects of the Cathedral of St. John the Divine, New York), completed in 1928, is claimed to be the most scholarly and carefully evolved modern Gothic building in America. Other notable architectural achievements in the U.S.A. are the two great cathedral-like railway stations of the Pennsylvania and New York Central Railroad in New York City.

See Gwilt's *Encyclopædia of Architecture*, 1903; and Russell and Sturgis's *Dictionary of Architecture*, 3 vols., New York, 1901–2; also James Fergusson's *History of Architecture in all Countries to the Present Day*, 1893–5, 5 vols.; Rosengarten'[illegible] *[illegible] of Architectural Style*[illegible]; Choisy's *Histoire de l'*[illegible] . 1899; the Fr. series of which the general title is *Bibliothèque de l'Enseignement des Beaux Arts*, Paris, 1887–92, by Laloux, Corroyer, and Palustre; the Ger. series entitled *Handbuch der Architektur*, ed. Durm, Darmstadt, 1895; the works of Ruskin. For modern A. consult Bruno Taut's *Modern Architecture*, London, 1929; also the many periodicals of the various societies and institutes.

Architecture, Free School of, an institute at Paris which provides gratuitous training in the principles and practice of A. Foreigners are admitted on the same footing as Frenchmen, but owing to the large number who have applied, the number of them is now allowed to form only a certain percentage of the list. Admission is by examination, the standard of which has been greatly raised of late, owing to the great increase in the number of applicants.

Architrave, an architectural term applied to the lowest part of the entablature (*q.v.*) which rests directly upon the columns. Also applied to the beam over a window or door or other square opening.

Archives is the name given to collections of important documents. It is now as a rule only used to denote government records, *i.e.* state A. For further details *see* RECORDS.

Archivolt, in architecture, the band of masonry framing a curved opening.

Arch-lute, a large lute, or double-stringed theorbo, formerly used by the Italians for the bass parts, and for accompanying the voice. It had fourteen notes, and possessed considerable power; it was employed by Handel in his early operas.

Archon, the highest magistrate in the Athenian and other Gk. democracies. According to tradition, the last king of Athens, Codrus, was succeeded by his son Medon as A. instead of king. The historical development of the office can probably be traced to the reduction of the power of the [illegible] (king), who was [illegible] functions only by the military and civil powers being handed over to other officials. At Athens there were nine As.; the chief, or A. eponymous, who gave his name to the year and dealt with domestic cases; the basileus, with religious powers; the polemarch, who had jurisdiction in military and foreign matters, and six thesmothetæ, or criminal judges. The office, originally of life tenure, became ann. and open to all citizens.

Archpriest, an eccles. term dating from the fourth century, and originally applied to a senior priest attached to a cathedral as assistant to the bishop and overseer of the subordinate clergy. The modern representative of the office is a dean. The term has a special application in the early seventeenth century to the superiors appointed by the pope to govern secular priests sent into England. These had been left without a head at the death of Cardinal Allen in 1594. The archpriest had twelve assistants, but was subordinate to the superior of the Jesuits in England. The office, which was much opposed, lapsed in 1621.

Arch Stone, wedge-shaped stones used in the construction of arches. The A.-S. of a common bridge has two flat faces, inclined to the breadth of the curve, but in the skewed bridge these corresponding surfaces are

twisted. Technically called *voussoirs* (*see under* ARCH).

Archytas, Gk. Pythagorean philosopher; *fl. c.* 400 B.C. Regarded as founder of scientific mechanics. Said to have invented the pulley and 'doubled the cube.'

Arcidosso, a tn. of Grosseto, Italy, 8 m. N.W. of Radicofani. Pop. 1997.

Arcimboldi (1533–93), an It. painter; was *b.* at Milan and *d.* at Prague. Amongst his works are the portraits of Maximilian II. and of Rodolph. When some of his pictures are viewed from a distance the central objects take the appearance of human figures.

Arcis-sur-Aube, tn. in Aube, France, on R. Aube, 16 m. N.E. of Troyes. The site of an engagement between Napoleon and the Allies under Schwartzenburg, March 20–21, 1814, in which Napoleon was forced to retreat. Pop. 2690.

Arcograph, *see* CYCLOGRAPH.

Arcola, tn. of Verona, Italy, 15 m. S.E. of Verona, on R. Alpone, tributary of Adige. Pop. 1813. The scene of Napoleon's victory over the Austrians under Alvinczy, Nov. 15–17, 1796. This forced the Austrians to abandon the relief of Mantua.

Arcon, Jean Claude de (1733–1800), Fr. military engineer, *b.* at Pontarlier. Became famous in Seven Years' War at defence of Cassel. Invented floating batteries used in siege of Gibraltar. Member of senate, 1799.

Arcos (don Rodrigue Ponce of Leon), Duke of, viceroy of Naples for Spain, 1646–48, whose taxation caused the insurrection of the people of Naples under Aniello Tommaso, or Masaniello as he was called. After 1648 the Duke of A. retired from political life.

Arcos de la Frontera, tn. of Cadiz, Spain, on R. Guadalete. The name refers to its fortification by the Moors as a frontier town in 1264.

Arcot: (1) Name of two contiguous maritime dists. of Madras, India. N. A. is bounded on the N. by Cuddapah and Nellore, on the E. by Chingleput, on the S. by S. A. and Salem, and on the W. by Mysore. Area 7386 sq. m.; pop. 2,207,712. S. A. is bounded on the N. by N. A. and Chingleput, on the E. by Pondicherry and the Bay of Bengal, on the S. by Tanjore and Trichinopoly, and on the W. by Salem. Area 5217 sq. m.: Both dists. are flat on the coast; hilly, with jungles, inland. Ceded to E. India Company, 1801. (2) Chief city of N. A., on R. Palar, 65 m. S.W. of Madras. Taken by Clive, 1751; lost to the Fr., recaptured in 1760. Taken by Hyder Ali, 1780. Passed finally to British, 1801. Huge fragments of tn. wall are seen solid as rock: was blown up with gunpowder. Above the ruins of the Delhi is Clive's Room. Pop. of N. A. 2,055,594; S., 2,320,085.

Arctic Animals do not present g variety in species, except in the of the lowest forms of life, *e.g.* deep-sea fishes which are unaffec by changes in lat. Molluscs, annell and jelly-fish are common to all t northern seas, while such fish as t salmon, cod, and halibut are plentifu and provide employment for Europea sailors. Insects are found far N., suc as bees, flies, moths, and butterflie but as the flora is scanty, they d not occur in great abundance. Th birds are chiefly sea-birds, as ... eider ducks, ... puffins, an ... migratory. ... walrus, seal ... whale—the white whale ... varieties of grampus, and bottle-nosed whale, and narwhal, the whalebone whale (*Balæna mysticetis*) is becoming rare; the Polar bear, reindeer, elk, fox, wolf, ermine, and musk-ox are the prin. terrestrial mammals. Insectivorous and herbivorous habits are naturally almost absent in A. A., which are piscivorous or carnivorous as they dwell chiefly in the sea or on land. Many of them exhibit the curious phenomena of becoming snowy-white in winter, and among these are birds, as the ptarmigan, and mammals, as the hares and lemmings, which are brown in summer, and the A. fox, which is slaty-blue in summer; the Polar bear is, of course, white all the year round. See *Manual of Natural History of Greenland*, by T. Jones, pub. by the Admiralty, 1875; A. Heilprin's *Geographical and Geological Distribution of Animals*, 1887.

Arctic Circle, The, is an imaginary circle drawn round the N. Pole at a distance of 23½ degrees therefrom, this angle being equal to the angle between the plane of the equator and the plane of the ecliptic. The corresponding circle in the S. hemisphere is called the Antarctic Circle. Within these limits the sun disappears entirely from view for a certain period in the year, and for another period is always visible. The length of these periods varies with the nearness to the Pole, the nearer the Pole the longer the period during which the sun is continually above the horizon.

Arctic Exploration. The first Arctic voyagers were the old Viking ancestry of the Norwegians, and if they have left no enduring marks to posterity, at least they discovered Iceland and Greenland and colonised them. After the time of Harald Härdråde, the Northmen gave up adventure in the N. Seas, and it was only in the fifteenth century,

when the English and Dutch led the van of seafaring nations, that A. E. was revived. There was, however, this clear difference between the objective during these earlier times and the modern quest, that whereas Eng. and Dutch explorers were constantly searching for a supposititious N.E. or N.W. passage to China or India, virtually the sole aim of the latter-day explorer has been the almost purely sentimental one of reaching the N. Pole. The first of the navigators, stimulated by the success of Columbus in the field of exploration to renewed efforts to discover a western route to Cathay, was Sebastian de Cabota, who in 1496 sailed from England towards the N.W. Little is known of Cabota's voyage, though it seems, according to a contemporary account, that he must, before turning eastward in despair, have sailed into the Gulf of St. Lawrence and partly through the Straits of Belle Isle from the N. opening, of which the coast of Labrador sweeps to the W., and so on to Shekateka Bay, where that coast trends eastward (51° N.). In 1553 the Muscovy Company of London Merchants, formed to promote commerce with Russia and the East, prepared an expedition 'for the discovery of Cathay and divers other regions, dominions, islands, and places unknown,' by the exploration of the seas eastward of the North Cape. The expedition, consisting of three ships, set out from Ratcliffe under the command of Sir Hugh Willoughby. The record of Willougby's wanderings, probably along the coast of Nova Zembla, was learnt from the explorer's own journal when, the following year (1554), some Russian fishermen found him and his crew, frozen to death, at the mouth of the R. Arzina, in Lapland. Richard Chancellor, who commanded the larger of the other two ships, enjoyed a better fate, reaching Wardhus in safety. The narrative of Chancellor's expedition, which was written by Clement Adams and preserved by Hakluyt, shows that Chancellor entered the White Sea, till then unknown to the civilised world, and explored the country round Archangel. After this follow the three voyages of Martin Frobisher in quest of a N.W. passage to Asia. None of these or any of the attempts made at this time resulted in the wished-for discovery, though some of them were not unproductive of results to geographical science. In his first voyage Frobisher found a bay which has since been named after him, in 61° N., and landed on an is. since called Gabriel Is., where his party for the first time in the history of Englishmen encountered the Esquimaux. In 1577 Frobisher made his second journey. He anchored in what was named by him Jackman's Bay, believing, indeed, that he had solved the problem of a N.W. passage to Asia, and landing on what is now known as Fox Land, formally took possession in the name of the Queen. Marching into the interior, his party discovered nothing at first but mosses, lichens, and a few juniper bushes and stunted firs. The third expedition sailed from the Thames in May 1578. The only result of the voyage was the finding of what was supposed to be gold, but which in all probability was merely ferruginous or cupreous pyrites, upon an is. in Bear Sound, which they named Countess of Sussex Is. In 1585 John Davis renewed the attempt to discover a N.W. passage to the East, publishing in 1595 a short narrative of his three voyages (1585–87) entitled *The World's Hydrographical Description*. The net results of Davis' first voyages were a better understanding with the natives of Greenland—the W. coast of which he explored up to 64° N., naming it Desolation—and the discovery that land still hemmed him in as far as 67° N. In his last voyage he sailed through Davis' Strait and the bay which was not navigated till close upon thirty years later by Baffin and since called Baffin's Bay, as far N. as Melville Bay. Thus he was on the direct route to the Pole, but his quest being a short passage to the Pacific, he deviated and sailed westward. Ten years later Barentz, the Dutch navigator, made his celebrated voyage in search of a N.E. route to China, and the narrative of his perils and death forms one of the most interesting and pathetic records of human bravery and endurance. The scene of his wintry sojourning was not revisited for nearly 300 years, when Capt. Carlsen, in 1871, landed there and found the wooden house, the ashes still upon the hearth, as the explorers had left it, together with an old clock, Barentz' flute, and other interesting relics of the ill-fated expedition, all of which are now in the possession of the Dutch government. With Barentz seems to end the quest for a short route to the East, or rather that quest is lost sight of in the general exploration of the Arctic. Hudson's first voyage took place in 1607, and resulted in the discovery of the most northerly point of the E. coast of Greenland (73°N.), called 'Hold with Hope.' He penetrated as far N. as 80° 23', and on returning discovered Jan Mayen Is. In 1610 he discovered Hudson's Strait and the

large bay which has left his name to posterity. His voyages opened the way to the Spitzbergen whale fisheries. In 1612–13 Sir Thos. Button, supported by the Merchant Adventurers of London, entered Hudson's Bay, and crossing over westward, explored Southampton Is. up to 65° N. Baffin as pilot and navigator in the *Discovery* investigated the coasts of Hudson's Strait in 1615, and later, with the same ship, circumnavigated the great sound with its numerous tributary channels, which has since received the name of Baffin's Bay. There was but little in the way of fresh discovery in the years immediately following the efforts of the sixteenth- and seventeenth-century explorers, though much was done to reap the benefits of their discoveries. After the formation of the Hudson's Bay Company, that company's servants, towards the later part of the eighteenth century, effected some important journeys to explore the shores of the American polar seas; Samuel Hearne navigating the Coppermine River to the Polar Sea, and Alexander Mackenzie discovering the mouth of the riv. named after him. Dutch rivalry in A. E. resulted in Marten's visit in 1671 to the Spitzbergen group of is., and the best record of the natural history and physical features of that part prior to Scoresby's *ccount of the Arctic regions*, in the iscovery by Captain Gilies in 1707 f Gilies Land, and in the opening up f the Dutch whale fisheries of Davis' trait. In 1806 the intrepid fisher nd scientific observer, Scoresby, adnced his ship, the *Resolution*, up to ° 12′ N., and sixteen years later, rcing a passage through the ice rring the approach to the E. coast Greenland, he surveyed that coast a distance of 400 m. In the course he eighteenth century Russian exrerspenetrated to the most northerparts of Siberia, Lieut. Chelkin in 1735 reaching the cape in 25′ N. which bears his name, o Bering, a Dane, put by Peter Great in command of the *St. Paul*, ut from Okhotsk to explore the rican side of the strait which he discovered twelve years prely, and which is named after After finding Mt. St. Elias he vrecked and perished in the y of the Aleutian Is.

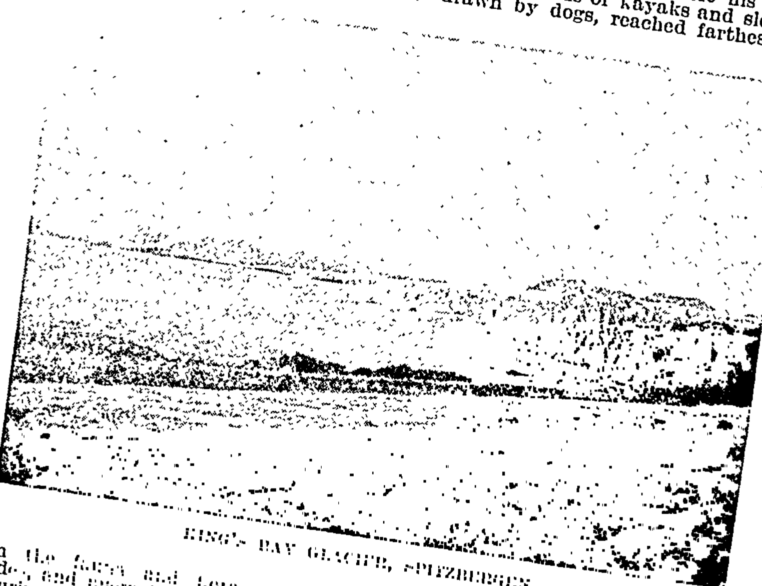
. appears to have been dropped land towards the last quarter of nteenth century, and it was only ifficulty that the government be induced to support even s of scientific research in polar In 1778, however, Capt. as instructed to sail northom Kamchatka and look for a N.E. or N.W. passage from the Pacific to the Atlantic. He reached Cape Prince of Wales, the W. extremity of America, and after passing through Bering Strait, found his way barred by ice. In 1815 the search for the N.W. passage was revived in England by the strenuous advocacy of Sir John Barrow, through whose influence a reward of £20,000 was offered for its accomplishment, and £5000 for reaching 89° N. (1818). The most celebrated names during this period of revival were those of Lieuts. Edward Parry and John Franklin, whose chief discoveries between 1819 and 1827 were Lancaster Sound, the continuation of which was called Barrow Strait, an archipelago, now known as Parry Is., Melville Is., Fury and Hecla Strait (a channel leading W. from the head of Hudson's Bay), and Prince Regent's Inlet, a wide opening observed on the third voyage in 1824 to the S. from Lancaster Sound. In 1827 a new chapter opens in A. E. with Parry's attempt to reach the Pole. This attempt was remarkable for the fact that the explorer abandoned his ship and endeavoured to make his way over the northward drift-ice with boats which his party dragged along on sledges. He reached the then highest lat. (82° 45′), but, carried southward by the current, he was forced to return. Prior to Sir John Franklin's ill-starred expedition in 1845, Capt. John Ross, with the financial assistance of Sir Felix Booth, a distiller, set out in a small steamer, the *Victory*, on a private expedition of discovery. The most remarkable feature of this expedition was Ross's sledge journey, after abandoning his ship, across the ice. In the course of his voyage he discovered the Gulf of Boothia (named after his patron) and King William Land, and located the position of the N. magnetic-pole. In 1845 Franklin, with the *Erebus* and *Terror*, set out on his tragic journey through the channels of that dense ice-packed region called by Sir George Nares the 'Palæocrystic Sea,' to Beechey Is., along the W. shore of North Somerset (discovered by Parry in 1819), through a southward channel called Peel Sound to King William Is., in the effort to reach some channel to Bering Strait. It appears, however, that the great ice-floes from the vicinity of Melville Is. rendered all progress impossible save by rounding the E. side of King William Is.; Franklin did not know that this latter was an is., and so perished with all his party. Numerous expeditions for some years afterwards endeavoured to ascertain Franklin's fate. Sir James Ross, in 1848, was

sent with two ships, the *Enterprise* and the *Investigator*, by way of Lancaster Sound, and with Lieut. M'Clintock made a long sledge journey along the N. and W. coasts of North Somerset. In 1850 elaborate and extensive plans of search were organised under Capts. Penny, Austin, Ommaney, Lieuts. M'Clintock, Collinson, and M'Clure. Austin and Penny went through Barrow Strait and discovered Franklin's winter quarters of 1845–46 at Beechey Is. This party wintered on the S. coast of Cornwallis Is. and arranged sledge travelling excursions for the spring, Penny undertaking the Wellington Channel route, M'Clintock advancing to Melville Is., while Capt. Ommaney went southward, discovering Prince of Wales Is., and Lieut. Brown investigated the W. shore of Peel Sound. In 1851 Lady Franklin sent out the schooner *Prince Albert* under Capt. Kennedy and Lieut. Bellot of the French navy, the Frenchman discovering in the course of a long sledge journey Bellot Strait separating North Somerset from Boothia, thus proving that this part of the Boothia coast was the N. extremity of the continent of America. In May 1851 Collinson, in the *Enterprise*, penetrated the narrow Prince of Wales Strait between Baring and Prince Albert Is., reaching Princess Royal Is., where M'Clure had been the previous year. He then wintered in Prince Albert Is. and despatched travelling parties in the spring of 1852 to explore Prince of Wales Strait and the S. portion of Prince Albert Land. When the ship was free Collinson went E. along the coast of N. America, and after wintering a second time in Cambridge Bay, he examined the shores of Victoria Land up to 70° 26′ N. and westward to 100 45′, being within a few miles of Point Victory, where, indeed, he would have learnt the fate of Franklin. This great voyage was only completed in 1854, when Collinson brought back the *Enterprise* safely to England. In the meanwhile M'Clure, in the *Investigator*, had passed the winter of 1850–51 30 m. from Barrow Strait at the Princess Royal Is., and actually saw a N.W. passage, which, however, he could not reach on account of a branch of the palæocrystic ice that had baffled Franklin off King William Land. This ultimately forced him southward round Baring Is., whence he endeavoured to drive a passage to the N. between the W. shore of King William Land and the cliff-like ice-walls. Eventually, after the narrowest escapes, he took refuge on the N. shore of Banks' Land, and in the early part of 1853, after preparing to abandon his ship for the American coast, was fortunately rescued. In 1852 the British government despatched another expedition, *viâ* Lancaster Sound, under Sir Edward Belcher, Sherard Osborn, Capt. Kellett, and M'Clintock. M'Clure's record was discovered by Lieut. Mecham, one of the sledge travellers of this expedition. This discovery soon led to the succour of M'Clure, who thus, partly by ship and partly by travelling over ice, had now in fact accomplished the N.W. passage, for which long-sought prize he was knighted, and, together with his party, received a grant of £10,000. In 1854 Dr. Rae, whose previous work in A. E. was in 1846–47, when he crossed the isthmus joining Melville Peninsula with the mainland and skirted the shores of Committee Bay and the E. coast of Boothia as far as Lord Mayor's Bay, joined Sir J. Richardson in a search for Franklin. He brought home tidings of Franklin's expedition from the Esquimaux, the immediate consequence of which was that M'Clintock, in the *Fox*, with Capt. Allen Young and Lieut. Hobson, prosecuted a thorough search of the W. coast of Boothia, the whole shore of King William Is., and Montreal Is. Eventually this party came upon a paper outlining the voyage of Franklin and telling of his death in June 1847 and the departure of the survivors in an attempt to make the Great Fish R., in which attempt none ever succeeded, though several traces of their struggles were subsequently found. M'Clintock's voyage proved that Franklin's expedition did in fact *discover* a sea-route from the Atlantic to the channels S. of Victoria and Wollaston Land to Bering Strait, and since that time Capt. Hall and Lieut. Schwatka, of the U.S. navy and army respectively, have discovered other relics of Franklin's expedition. A notable expedition in quest of Franklin was that of Dr. Elisha Kent Kane of the U.S. navy, who, sent out by the U.S. government in 1852, to look for the Eng. explorer, made his winter quarters in Van Rensselær Harbour, and with his boat, the *Advance*, pushed on to Smith Sound, where his further progress was stopped by ice at the entrance. Kane's contributions to A. E. contain a great deal of valuable information as to fauna, flora, magnetic conditions, and climate; the first really authentic and detailed account of the Etah Esquimaux; and, by his sledge journey to Cape Constellation, the making known to the world of the marvellous waterways along the W. of Greenland between Smith Sound and the Arctic Ocean, which afford

the acknowledged easiest route to the Pole.

In 1871 Charles Hall, of Cincinnati, took the *Polaris* for 250 m. up the channel which runs N. from Smith Sound. He is credited with having reached an unprecedented lat. by ship, and exploring Grant Land to within 412 m. of the Pole. In 1875–76 Sir George Nares, with Lieuts. Aldrich, Markham, and Beaumont, touched 83° 20′ N., after pushing along Grant Land to 85° W. long. and Greenland to Cape Britannia. In 1883 Lieut. Greely, of the U.S. army, made extremely valuable observations round Lady Franklin Bay (81° 44′)

specially designed to sustain and
to powerful ice-pressure, he set out
his brilliant expedition to cross
polar ocean by relying on the dr
from E. to W. after deliberately fo
ing the ship into the ice. The *Fra*
ultimately emerged from the pack
the N. of Spitzbergen, Dr. Nansen
chief discovery being to ascertain th
existence of a very deep ocean to th
N. of the Franz Josef group, whic
was found to be a continuation of the
water to the N. of Spitzbergen. In
April of 1895 Nansen with a single
companion, Johansen, left his ship,
and by means of kayaks and sledges
drawn by dogs, reached farthest N.



KING'S BAY GLACIER, SPITZBERGEN

n the fauna and flora, climate,
des, and magnetism of this region.
uring the sojourn of the Greely ex-
dition (1881–84), Lieut. Lockwood,
touching 83° 24′, gained for the
S. the honour of reaching the then
thest N. The next most important
k of this period was the traversing
he great glacier forming the in-
or of Greenland by Nansen and
ry. Nansen's theory was that a
ent flowed at some point between
Pole and Franz Josef Land from
iberian Arctic Sea to the E. coast
reenland; but his objective was
so much to reach the Pole, a
r of possibly secondary impor-
as to investigate the great un-
region that surrounded the
nd in 1893, in the *Fram*, a ship

(86° 13′). Dr. Nansen's theories are on the whole sound, and the light he threw on what has been called the Polar question established his fame for all time. Mr. Peary in 1892 and 1895 made journeys over the inland ice of Greenland, but beyond ascertaining the N. limit of the ice-cap of the Greenland glacier, added little to general information. Then in 1897 the Jackson–Harmsworth expedition in the *Windward* explored Waigatz Is. and the W. part of Franz Josef Land, discovered a wide channel opening on a northward sea, and made important magnetic and meteorological observations. In 1897 Andrée, with Frænkel and Strindberg, set out on their unhappy balloon journey. Except for buoys

cast overboard, nothing further was heard of this expedition until 1930 when their bodies were found in White Is., near Spitzbergen. The latest of three buoys found showed that the balloon reached 82° N. 25° E., but no other traces were discovered until 1930. Then Andrée's diary showed that at one time the balloon reached a point a little higher than 83° N. In 1899 Sverdrup, Peary's companion in 1892, led a party in the *Fram* up Smith Sound to explore the N. coast of Greenland, while in the same year Lieut. Peary, with the help of Esquimaux, followed the same route, and the Duke of Abruzzi on the Norwegian whaler *Jason* proceeded to Franz Josef Land. In 1900 various sledge parties were sent N., one, under Captain Cagni, reaching a point 20 m. beyond Nansen's farthest N. The names of principal note in the twentieth century, notable for Peary's achievement in reaching the Pole, are those of Peary himself, Amundsen, Ejnar Mikkelsen, and Mylius-Erichsen. Peary undertook his last voyage in 1908, shortly before the time that Dr. Frederick A. Cook claimed to have reached the Pole. With a few whites, nearly 50 Esquimaux, and 200 dogs, he crossed the frozen seas, passing his own previous record of 87° 6′ N. in 1906, and ultimately, on April 6, 1909, gained for the U.S. the honour of first reaching the Pole. The rapidity of Peary's travelling may be gauged from the fact that he traversed nearly 150 m. in five days going N., and on his return journey over 400 m. in sixteen days. He located the Pole on a deep ice-covered ocean, there being no land in its vicinity, his soundings being 1500 fathoms within 5 m. of the Pole. The chief work of Mylius-Erichsen was the completion of the exploration of the hitherto unknown parts of the coast of Greenland, from Cape Farewell, 60° N., for over 1600 m. to 83° N. He died of cold and starvation after crossing the inland ice between Denmark Fiord and Lambert Land in an effort to identify Peary's Navy Cliff. Mikkelsen, another Dane, recovered Erichsen's records for Denmark in 1912, and it is worthy of note that these records alter the entire cartography of N.E. Greenland; they prove that Peary Channel is no more than a fiord, Hazen or Peary Land merely a N. extension of Greenland and not separate, and that Greenland extends over 20° eastward of Peary's farthest E., the net result being the addition of over 150,000 sq. m. to Greenland, and the discovery that North-east Foreland (12° W. 83° N.), the eastern extremity of Greenland, is within 23° of Spitzbergen. Other explorations of note are those of O. Sverdrup in Grinnell Land and his discovery of Helberg and Rengues Is., the re-location in 1904–5 by the Norwegian Amundsen of the North Magnetic Pole in 70° N. 97° W., and the investigations of the Esquimaux of V. Stefansson from 1908 to 1912. The great feat of Amundsen was the unquestioned accomplishment of the N.W. passage over Franklin's route.

A 'N.E. passage' was only discovered in the late years of the nineteenth century, and even to-day the waters eastward are but cursorily known. Since Nordenskiöld's journey in the *Vega* (1879), Wilkitsky's expedition in two ice-breakers in 1915 and Amundsen in the *Maud* in 1919–20 made the journey. Wilkitsky's boats brought back much valuable information on the Arctic coast of Siberia, and since then the Soviet Republic has sent out survey boats to the same region. Thus practical work remained the keynote of exploration as before 1913, it being realised that the objective in the Arctic should be not so much the discovery of open seas near the Pole, but of land in N. latitudes which might be feasible as a base for explorers to the Polar seas. Not that efforts do not continue to be made to cross the Pole, for Amundsen's *Maud* tried to follow Nansen's former route, in the hope of drifting to the Pole; but the effort was not successful, though the expedition which, later, was made under Wisting, returned with much useful information about the Siberian coast supplementary to that of Wilkitsky. Peary remains the only explorer who has sailed to the Pole, but his reported finding of Crocker Land in 85° N. lat. was not confirmed by Amundsen in his polar flight in 1926, nor by the American explorer, D. B MacMillan, who explored Ellesmere and other is. during the period 1913–17. One good result of Peary's exploit has been to reconcile explorers to research rather than to more or less useless spectacular discoveries. The Norwegian, K. Rasmussen, throughout the last ten years has opened up a mine of knowledge on Greenland and the Esquimaux, as also have E. Mikkelsen and J. P. and L. Koch (1921–23).

The aeroplane has not been an unqualified success for exploration work. Amundsen, however, though he failed to reach the Pole in 1925, showed that with sufficient petrol the feat could be accomplished, and in the following year Commander R. Byrd flew to the Pole from Spitzbergen and back, and Amundsen's dirigible *Norge* also crossed from the same base to Alaska. Amundsen was accompanied by

General Nobile, the It. designer of the airship, but unfortunately the enthusiasm of Amundsen's adventurous spirit caused him to quarrel with Nobile over the allocation of the credit for the flight as between Italy and Norway, and the two parted. Later, however, when it was learned that Nobile was missing on his second flight, Amundsen generously joined in the flights organised for relief. Nobile was eventually rescued, but nothing further was ever heard of Amundsen.

The most useful expedition of 1928 was that of Capt. Sir Hubert Wilkins, who flew from Alaska to Dead Man's Island, Spitzbergen. The flight lasted less than a day, but though no new land was discovered in the waters N. of Canada, useful observations were made on meteorological and navigation conditions in that region. Later in the year General Nobile made three flights in his dirigible *Italia*, and on the third reached the Pole, only to be wrecked off North-east Land. Numerous expeditions were organised for relief by many nations, but the Soviet icebreaker *Krassin* was the first to reach the stranded party. Meanwhile Nobile had been taken off the ice by a Swedish aviator. Half the crew, however, perished, no trace of them or of the wrecked airship in which they had been carried away being found. With Amundsen, who, as stated above, joined in the relief expeditions, were five other men, who also disappeared.

Arctic Ocean is usually defined as the area of water within the A. circle. It lies to the N. of Europe, Asia, and N. America, and communicates with the Atlantic by means of the wide sea between Norway and Greenland; Denmark Strait, between Greenland and Iceland; and Davis Strait, between Greenland and British N. America. The only communication which it has with the Pacific is by means of Bering Strait.—A relatively mild climate is found a long way inside the A. circle owing to the influence of the Gulf Stream off the coast of Norway, and, on the other hand, A. conditions are caused to exist far into the Atlantic by means of the A. currents, which low through Davis Strait and along he E. coast of Greenland. The sea etween Norway and Greenland beongs physiographically to the same asin as the A. O., as ridges between reenland, Iceland, Faröe Is., and the . of Scotland separate it from the tlantic region. The region immediely at and around the N. Pole is overed with rough pack-ice, whilst ary found the depth of the water at e N. Pole itself to be more than 00 fathoms. The whole ocean, in t, is covered with immense ice-fields, which vary in depth from 5 30 ft. The average depth of the i pack, however, is about 10 ft. It frozen together in winter but in t summer it is broken up into floes varying size. Lanes form in the ic pack, and when these lanes close u again the floes are piled up on on another, and the well-known 'hum mocky' ice-floes result. If hummock ice is piled up against a shallow shor and so fixed for a great length of time the appearance is produced which Nares called the Palæocrystic sea. A permanent layer of fresh water is found in many places outside the edge of the ice-pack. This layer, which has a depth of 6 ft. in some places, is formed partly by the melted ice and partly from the outflow of the rivs. of Siberia. The ice-pack as a whole has been found to drift from the middle of the N. coast of Siberia north-westwards towards the N.E. extremity of Greenland. Large quantities of ice also pass down each year between Spitzbergen and Greenland. The warm surface waters of the Atlantic flow up into the A. regions, passing between Greenland and Norway. When they arrive there they are chilled by contact with the icy A. waters, and gradually sink to the bottom. Finally they return, along the E. side of Greenland, and down Davis Strait, as a cold current carrying with them the icebergs which are such a danger to navigation in the Atlantic. The above is only an adumbration of the circulatory system which exists. The winds, the Gulf Stream, and the various submarine ridges and depressions between the continents and islands, are all factors which complicate the movements of the waters. The A. O. is bordered by a fairly broad continental shelf, this renders the ocean as a whole shallow. Along the N. of Europe and Siberia, to 135° E. long. the water is very shallow indeed, and proceeding westward from this point the depth does not exceed 80 fathoms. Between Franz Josef Land and Nova Zembla the depth of the water varies from 100 to 150 fathoms, and between Norway and Bear Is. it is 240 fathoms. In the Kara Sea a depth of over 400 fathoms is found. The depth of the ocean E. of 135° long. suddenly increases to 2000 fathoms. The *Fram*, in 1893–6, drifted with the ice-pack from 79° N. lat. and 138° E. long. into the neighbourhood of Spitzbergen and the depth of the sea along her route was ascertained to be more than 1800 fathoms, and frequently over 2000 fathoms. The Nathorst expedition of 1898 found that the greatest depth W. of Spitzbergen was 1720 fathoms. The temp. of the A. O. is

found to vary somewhat at different depths. The surface temp. in the Polar regions is usually about the freezing point of salt water, 29·2°. It increases at about 110 fathoms to 33°, and between 120 and 350 fathoms the temp. is higher than at any other depth, ranging between 35° and 39·9°. This warm layer is probably due to the influence of the Gulf Stream. Directly underneath this, down to nearly 1000 fathoms, there is a drop in the temp. to about 31·9°. Lastly, from 1000 fathoms to the bottom the water is slightly warmer, and the temp. is fairly uniform, being between 33·1° and 33·4°. Near the Pole itself there appears to be no wind in the winter, and the air is clear; in lower lats., round Franz Josef Land and Greenland, for instance, whilst the temp. is higher, rough winds prevail. These are generally S.W. along the coast of Norway, and as far as Franz Josef Land, but W. of this region north-easterly winds are general. During the summer fogs and mists are very frequent, and form one of the greatest dangers to explorers. The prin. rivs. which flow into the A. O. are the Onega, the Dwina, and the Petchora in Europe, the Lena, the Yenisei, and the Obi in Asia, and the Mackenzie in America. The lofty A. lands are covered in the interior to an enormous depth with snow and ice, and vast glaciers are found in some places, for instance, the Humboldt Glacier on the W. coast of Greenland. The smaller seas and bays contained in the A. O., Baffin Bay, Bering Strait, Davis Strait, the Greenland Sea, the Kara Sea, the White Sea, etc., are described at length in separate articles.

Arctiidæ, a family of lepidopterous insects; the tiger moth.

Arctinus, of Miletus, anct. Gk. epic poet, probably of the eighth century B.C. His life is unknown. His works, which are said to have included the *Æthiopis*, a continuation of the *Iliad*, and *The Sack of Troy*, are lost except for a few fragments, collected in Kinkel's *Epicorum Græcorum Fragmenta*.

Arctium, a genus of Compositæ, consisting of one species, common to Europe and Asia. This is *A. Lappa* or *A. majus*, the burdock, which has some hooked leaves. These catch hold of a passing object, and when they are released the seeds are jerked out.

Arctomys is the generic name of the marmots, which belong to the squirrel family (*Sciuridæ*). They are small rodents found in the colder regions. *A. marmotta* is the Alpine marmot. The American kinds are known as woodchucks.

Arctostaphylos, or bear-berry, is a genus of plants found wild in the mountainous parts of England and Scotland, and the N. of Europe generally. It has been used in tanning and in dyeing a greyish-black colour as well as for gravelly complaints and for diseases of the urinary organs.

Arcturus, or Alpha Boötis, perhaps, next to Sirius, the best-known star, and the brightest in the N. sidereal hemisphere. It is one of the eleven stars brighter than the first magnitude and the sixth brightest in the heavens, its magnitude being 0·3. A. derives its name from two Gk. words, ἄρκτος, the bear, and οὐρα, tail. It is not in the constellation called the Ursa Major (Great Bear), but is on a line drawn through the two hinder stars of the tail of the Bear. A. has been the subject of many literary references in anct. and modern times, and perhaps one of the oldest references to it is contained in the book of Job in the Bible (Job ix. 9 and xxxviii. 32), though possibly here, as elsewhere, the name of A. is wrongly used for the constellation the Great Bear. Hesiod in 730 B.C. refers to this star in his *Works and Days*. The poet Shelley, in his *Dream of the Unknown*, uses the word in the plural, singing of 'Daisies, those pearl'd Arcturi of the earth, the constellated flower that never sets.' Astronomically A. has many points of interest, not the least being that it is the fastest moving of the brighter stars, its velocity being 260 m. a second. Its 'proper motion' is 228″ a century, which is very high. A. is approaching the earth at the rate of about 4 m. a second. It will, however, take a long time to arrive, for its light, travelling at the rate of 186,000 m. a second, takes about twenty-five years to reach us. In type the star resembles our sun, its spectrum being full of metallic lines, but it is 2000 times more luminous.

Arcueil, a tn., Seine, France, 4 m. S. of Paris, of which it forms a suburb. Famous for ruins of an aqueduct built by Emperor Julian. Pop. 15,000.

Arcy, Grotto of, a cavity in a hill in the dept. of the Yonne, France, about 3 m. S. of Vermanton. It contains various apartments, in some of which are found stalactites and stalagmites. The cathedral of Auxerre is supposed to have been built of stone from this grotto.

Ard: (1) A loch in the S.W. of Perthshire, Scotland. (2) Ard or Aird means 'height,' and is found in many geographical names in Scotland and Ireland.

Ardagh: (1) A. vil. in Longford, Ireland, formerly the seat of a bishopric. Pop. 1516. (2) A vil. in Limerick, Ireland. Pop. 1277.

Ardagh, Sir John Charles (1840–1907), British soldier and diplomatist. Educated at Woolwich; received his commission in 1859 in Royal Engineers. Acted in his diplomatic capacity at Constantinople, 1876 and 1881; Berlin, 1878 and 1880; in the Bulgarian Boundary Commission of 1879; as commissioner for the settlement of the Turko-Greek boundary dispute of 1881; at the Hague Peace Conference of 1899; on the Chile-Argentina Arbitration Tribunal, 1901; and on the S. African Claims Commission, 1901–2. He served in the Sudan Expedition of 1884–6; directed the School of Military Engineering at Chatham during 1894–6; was director of military intelligence, 1896–1901; gov. director of Suez Canal, 1902; member of council of British Red Cross Society, 1905; delegate to Swiss Conference for revision of Geneva Convention, 1906. See *Life* by Susan, Countess of Malmesbury, 1909.

Ardahan, a tn. of Russian Armenia. Ceded to Russia by Turkey, 1878. Pop. 800.

Ardalan, dist. of Kurdistan, Persia, forming part of the prov. of Irak-Ajemi, and embracing the basin of the Shirwan Rúd. Area 6000 sq. m.; pop. 150,000. Chief tns. Kermanshah (cap.) and Sinna.

Ardash, a trade term for inferior Persian raw silk called girwam in Persia.

Ardashir, the modern form of Artaxerxes, and the name of three Persian monarchs of the Sassanian dynasty. A. I., 226–41, founded this line by overthrowing Artabanus, the last Parthian king. A. II., who came to the throne 379, was deposed 383. A. III. was king, 628–30.

Ardatov, a Russian tn. in Simbirsk, on the R. Alatyr; pop. about 5000.

Ardea, anct. tn. of Italy, 24 m. S. of Rome. The traditional cap. of the Rutuli. The modern tn. occupies the ite of the ancient citadel.

Ardebil, a tn. of Azerbaijan, Persia, n the Kara-Su, 100 m. E. of Tabriz; op. 16,000. Favourite residence d the burial-place of Persian rulers. ffered in Russo-Persian War, 1826–. Stands on important caravan te.

Ardèche: (1) Riv. in dept. of same ne, France. Rises in Cevennes flows 60 m. into Rhone near t-Saint-Esprit. (2) Dept. in S.E. nce. Area 2140 sq. m.; pop. 358. The dist., which includes of ancient Languedoc, is moun-us and largely volcanic. Cap. s.

dee, a tn. of Louth, Ireland, on ee. It contains a thirteenth-ry church, and two fourteenth-y castles. Pop. 1773.

Ardemano, Teodoro (1664–17 was *b.* at Madrid, and was an ar tect, painter, and sculptor. He s died painting under Claudio Coe and afterwards gave his time mathematics and architecture. painted the frescoes in the church St. Francis, Madrid, and among h sculptures are the tombs of th Dauphin of France and of the Quee of Savoy. The cathedral of Granad is partly his work.

Arden, Forest of, dist. in N. War wickshire, England, originally part o a forest, which covered a large part of the midlands. Undulating and still well-wooded. It is probably the scene of Shakespeare's *As You Like It*. His mother claimed to belong to the famous Arden family, founded in the eleventh century.

Arden, Richard Pepper, Baron Alvanley (1745–1804), was educated at Manchester Grammar School and at Trinity College, Cambridge. He was called to the Bar in 1769, became solicitor-general, 1782–83, attorney-general and chief justice of Chester, 1784, master of the rolls, 1788, and chief justice of the common pleas, 1801. He was M.P. for Newton, Aldborough, Hastings, and Bath.

Ardenne, General Von (1848–1919). —Military critic of the *Berliner Tageblatt* (1917–18), in succession to Major Moraht, who died in 1917. His was pre-eminently the task of breaking bad news gently to the Ger. public. He described the Battle of Arras of 1917 as making an 'inconvenient gap in the otherwise unbroken Ger. front,' while the great Ger. retreat of the autumn of 1917 was merely 'a movement to lure the enemy into more open terrain.' Again in 1918 the Ger. retreat from th Marne was a move to 'shorten th Ger. front,' and when it began to b clear that irretrievable disaster was threatening the Ger. armies the terror inspired by the tanks was Ardenne's sole explanation. He had a picturesque style of writing, as is illustrated by such a phrase as 'the forward streaming terror of the avalanche of tanks,' but when his numerous ingenious explanations of 'mere tactical manœuvres' were refuted by the logic of hard facts he gave up military criticism.

Ardennes: (1) Formerly the name of a large, hilly, and wooded dist. embracing parts of Belgium, Germany, and France; now applied to the wooded heights which extend from S.E. Belgium into France, on each side of the Meuse. The highest elevations are about 2000 ft. The industries of the dist. are pasturage and mining. This hill and forest region, watered by the Meuse and Aisne, was

the scene of heavy fighting in the early days of the Great War, the Ger. invading armies marching to S.E. Belgium through Luxemburg in the S. Ardennes and through Malmédy near the N. part of the dist. The fate of Liège (Aug. 1914) cleared the road for the Gers. between A. and Visé when, under the Duke of Würtemberg and the Crown Prince they resumed their advance by the hills to the Luxemburg railway lines. After the fall of Liège, General Von Bülow, on the pretext that the inhabitants of the tn. of Ardennes had attacked Ger. troops, ordered the tn. to be burned and 100 inhabitants shot. (2) Dept. of N.E. France, bordering on Belgium. Area 2020 sq. m.; pop. 302,000. Mézières is the cap. and Sedan the chief tn. The valleys are fertile, and there is much mineral wealth.

Ardebla (dim. of Ardea), a little heron.

Ardfert, a vil. in co. Kerry, Ireland, about 6 m. N.W. of Tralee. It is the see of a bishop. Pop. 1324.

Ardglass, a small seaport, fishing station, and bathing resort in co. Down, Ireland, Pop. 499.

Ardigo, Roberto, *b.* in 1828 at Casteldidone, Cremona, Italy, was an It. philosopher. He became canon of the cathedral at Mantua, but leaving the church he was appointed professor of philosophy at Mantua. He wrote a discourse on Peter Pomponacus, one on the solar system, and also philosophical works.

Ardilaun, Arthur Edward Guinness, first and only Baron (1840–1915). Educated at Eton and Trinity College, Dublin. Head of the great brewing firm of Arthur Guinness & Co. Conservative M.P. for Dublin, 1868–9 and 1874–80. Raised to peerage, 1880. Acquired St. Stephen's Green (Dublin) and Muckross estate (Killarney) for the public.

Arditi, Luigi (1822–1903), It. musician and composer, *b.* in Piedmont, graduated at Milan Conservatory 1842. In 1846 he visited Havana as violinist with Bottesini, the double-bass player, and in 1847 went to New York as conductor of the Havana Opera Company. In 1858 he became conductor of His Majesty's Theatre, London, being Patti's favourite conductor. Operas: *La Spia*; *I Briganti*; and *Il Corsaro*. Also composed waltz songs *Il Bacio* and *Fior di Margharita*. Pub. *Reminiscences*, 1896.

Ardluke, an Eskimo name for the grampus.

Ardmore: (1) Vil. and watering-place of Waterford, Ireland, 6 m. from Youghal. Pop. 197. (2) Co. seat of Carter co., Oklahoma, U.S.A., home of the Chickasaw Indians, 98 m. N.E. of Fort Worth. Pop. 14,181. (3) Tn. of Montgomery co., Pennsylvania, U.S.A., 8 m. from Philadelphia.

Ardnamurchan Pt., headland in Argyllshire, Scotland; the most westerly point of the mainland. The lighthouse on it was built in 1849.

Ardoch, a vil. of Perthshire, Scotland, 8 m. S.W. of Crieff, containing the best-preserved Roman camp in Great Britain. Pop. 985.

Ardouin-Dumazet, Victor-Eugene, a Fr. journalist who was *b.* at Vizille (Isère) in 1852. His works were mostly on military questions, the titles of some of them being: *La France avant la Révolution*; *Le Nord de la France*; *Les Frontières du Nord et les Défences belges de la Meuse*, 1889; *L'Armée et la Flotte*, 1893–96; *Une Armée dans les neiges*, 1894; and *Voyage en France*.

Ardoye, a tn. in the prov. of W. Flanders, Belgium; pop. 6454. Noted for its cloth-weaving works.

Ardres, a tn. in the Pas de Calais dept., France. It manufs. lace, net, and arras. Pop. 2839.

Ardrishaig, a port of Argyllshire, Scotland, on Loch Gilp and the Crinan Canal, 19 m. S.W. of Inverary. Pop. 1244.

Ardrossan, a seaport of Ayrshire, Scotland, burgh of barony and police burgh, governed by a provost and council. Important harbour, the construction of which was begun by Hugh, the twelfth earl of Eglinton, in 1806. The tn. is noted for its shipbuilding and fisheries, and there are collieries and ironworks in the neighbourhood. A ruined castle with its dungeon, known as 'Wallace's Larder,' may still be seen. Pop. 7214.

Ardsley: (1) Now incorporated with Barnsley, East Ardsley par. and vil. 3 m. from Wakefield, collieries, and iron-smelting works and railway works. Pop. 4691. West Ardsley, 5 m. from Wakefield. Collieries and stone quarries. Pop. 8480. (2) Urban dist. of W. Riding of Yorkshire, 3 m. from Wakefield. Pop. 7477. Has coal, iron, and woollen industries.

Ardstraw, parish of Tyrone co., Ulster, Ireland, comprising Newton-Stewart, Ardstraw, and Douglas Bridge. Pop. 8097.

Ardtrea, or Artrea, parish in Tyrone and Londonderry cos., Ulster, Ireland, containing part of Moneymore. Pop. 5035.

Arduini, Carlo, an It. author *b.* in 1815. He became a journalist at Rome, and after the fall of the Republic of Mazzini went to Switzerland and was appointed professor of It. language and literature at the Polytechnic, Zurich. Among his works are a history of Picenum: *Stefano Porcari, or the Last of the Romans*, a drama, 1849; a work on the philosophy of

Dante and on literature and art during the It. Renaissance; and one on the philosophy of the beaux-arts in Italy.

Ardwick Limestone is the name given to a calcareous series of beds in the upper part of the coal formation of the dist. rou[illegible] tains remains c[illegible] Manchester ha[illegible] ately above it.

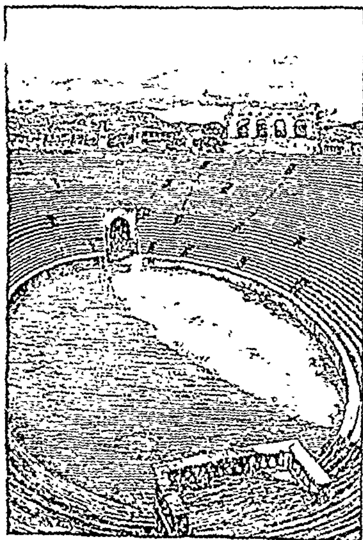
Ardwrock, a castle near Inver, Perthshire, Scotland, where Montrose was imprisoned 1650. It is now in ruins.

Ardys, succeeded his father Gyges to the crown of Lydia, and reigned 678–629 B.C. He took Priene, and made w[illegible] Cimmerians, [illegible] ads of Scythia, [illegible] of A. *See* Herodotus, i. 14, 15.

Are, unit of Fr. land. A square measure, one side of which is 10 metres long.

Area, quantity of surface. The area [illegible] perpendicular height. Area of a triangle = half the length multiplied by perpendicular height. Area of a circle $= \pi r^2$, where $\pi = 3 \cdot 1416$ and r = radius. *See* MENSURATION and SURVEYING.

Areca, a genus of Palmæ, grows in tropical Asia. *A. catechu* is cultivated all over India for its seeds, the pinang or betel nuts; mixed with lime and the leaf of the betel pepper it is universally chewed. *A. oleracea* or *Oreodoxa oleracea* is the cabbage-palm of the W. Indian Is.; its leaves, which grow at the top of the tree, and its nuts are eaten, while the hard trunk is used as a water-pipe.



THE ARENA AT VERONA

Arecibo, a city on the N. coast of Porto Rico. Pop. 10,039. Chief exports are coffee and sugar. The harbour is dangerous. Near are the famous caves of Consejo.

Aregio, Pablo, an It. painter of the sixteenth century, was probably a pupil of Leonardo da Vinci. He with Francisco Neapoli painted the altar in the Cathedral of Valence.

Arena, the central part of an amphitheatre where the fights of the gladiators and wild beasts were held. Its name was derived from the Lat. *arena*, sand, and it was so called because it was usually covered with sand.

Arena, Antoine, a Fr. jurist and macaronic poet who *d.* in 1544. His two chief works are *De Arte Dansandi* and *Meygra Entreprisa Catholiqui Imperatoris*, two burlesques.

Arena, B[illegible] (1775–1829), a [illegible], was a Fr. [illegible] member of the [illegible] nd in 1798 was appointed deputy to the 'Conseil des Cinq-Cents.' He opposed Bonaparte and had to flee. He went to Leghorn where he *d.*

Arena, Joseph (1770–1801), was a Fr. officer and politician. He took part in the campaign in Italy and in the siege of Toulon, and was appointed deputy for Corsica to the 'Conseil des Cinq-Cents.' He was accused with others of plotting against the life of Bonaparte, was condemned to death, and executed in January 1801.

Arenaceous (Lat. *arena*, sand) **Rocks** is a term applied to those rocks which are formed of any variety of sandstone. The fine particles of quartz, of which sand consists, mingle with particles of other material, such as mica or felspar, and when cemented become rocks. When the clayey cement predominates they are known as *argillaceous rocks*.

Arenal, a small tn. of S. America, in the state of Miranda, Venezuela.

Arenaria, a genus of Caryophyllaceæ, is known in Britain as the sandwort. *A. peploides*, the sea-purslane, grows on the sea-coast and is noted for the number of its carpels and for its fleshy leaves. *A. cherleria*, the cyphel, is found in northern latitudes.

Arenburg, formerly a Ger. duchy of the Holy Roman Empire; now belongs to the Prussian administrative dist. of Coblenz. A. family is dis-

tinguished in Ger. history from early times. Present duke has a fine collection of paintings at his residence in Brussels.

Arendal, a Norwegian seaport, situated at the mouth of the R. Nid. Pop. 10,269. In the tn. and neighbourhood are paper, cotton, and wood-pulp factories and engineering and shipbuilding works.

Arendonck, a tn. in Antwerp, Belgium, noted for its manufs. of hosiery. Pop. 5050.

Arends, John (1738–1805), a Dutch painter, who worked at Dordrecht, Amsterdam, and Middelburg. His pictures consist chiefly of landscape and sea scenes.

Arends, Leopold (1817–82), *b.* near Vilna, Russia. Settled in Berlin 1844, where he *d.* He invented a system of stenography which has become very popular on the Continent. Pub. *Vollständige Leitfaden* in 1860. Also wrote dramas, natural history, and ancient Hebrew music.

Arends, Thomas (1652–1700), was a Dutch poet. He wrote comedies and tragedies, and a volume of his poetry entitled *Mengelpoezij* was published in 1724.

Arendt, Martin Frederic (1773–1823), a Dan. antiquary. He travelled almost the whole of Europe, and gave his time to the study of the language, mythology, and history of Scandinavia. When in Italy he was suspected of Carbonarism and put into prison, and he *d.* near Venice shortly afterwards.

Arène, Emmanuel, a Fr. journalist and politician, was *b.* at Ajaccio in 1856. He became secretary to Edmund About, and editor of *Le XIXe Siècle*, and he also wrote for *Paris* and *Le Matin*. In 1881 he was appointed deputy for Corsica, and he pub. *Le Dernier Bandit* in 1887.

Arène, Paul-Auguste (1843–96), a Fr. writer and poet. Amongst his earlier works are *Jean des Figues*, *Les Comédiens errants*, and *Le Duel aux lanternes*, and the four novels, *Le Tor d'Entrays*, *Le Clos des âmes*, *La Mort de Pan*, and *Le Canot des six capitaines*. He also wrote many critical essays and fantastic stories, as well as *Le Prologue sans le savoir*, 1818; *La Vraie Tentation de Saint Antoine*, 1879; *Vingt jours en Tunisie*, 1884; *Contes de Paris et de Provence*, 1887; and *Domnine*, 1894.

Arenenberg, a castle on the borders of Lake Constance, Thurgau, Switzerland. It was the residence of the Countess of Saint-Leu, ex-queen of Holland, and of Prince Louis Napoleon, afterwards Napoleon III.

Areng is the name of one of the palms that produce sago and palm wine, found in all the is. of the Indian Archipelago. The only species, *A. saccharifera*, has a trunk 20 or 30 ft. high covered with coarse black fibres. It yields a large amount of sap, which, when first drawn from the tree, is transparent. It soon becomes turbid and milky, and when fit for drinking is of a yellowish colour, with a large amount of astringency. It is very intoxicating. The coarse fibres are made into cables, and sago is obtained from the trunk.

Arenicola (Lat. *arena*, sand, *colere*, to inhabit), the lob-worm or lug-worm, an annelid, or segmented worm, often used for bait. The commonest species is *A. piscatorum* found in the Mediterranean and North Sea.

Arensburg, a seaport on the Is. of Oesel, at the entrance of the Gulf of Riga, Latvia, which exports grains, timber, hemp, and skins. It contains an ancient castle, a Russian and a Lutheran church. It was taken by the Russians in 1710; pop. 4400.

Areometer, an instrument for measuring the sp. gr. of fluids. *See* HYDROMETER.

Areopagus, 'the hill of Ares' (*q.v.*) in Athens, which gave its name to the judicial assembly of elders held there. This council may have been instituted by Cecrops as early as 1556 B.C. Others date its origin 1507 B.C. Its powers and functions were greatly increased by Solon, 591 B.C. It was formed of ex-archons and other men of high moral character, and exercised the right to inquire into men's incomes, to punish idleness and immorality, and to try persons for homicide and conspiracy. It came to an end *c.* A.D. 400. Paul preached on 'Mars' hill,' A.D. 52 (Acts xvii.).

Arequipa: (1) A coast dept. of S. Peru, divided into seven provs. Area 21,947 sq. m.; pop. 360,000. Mountainous region with fertile valleys. Chief exports are fruit and vegetables, alpaca, coca leaves and borate of lime. (2) Tn. founded by Pizarro, 1539; pop. 65,000. Damaged by earthquakes in 1582, 1609, 1784, and 1868. Bishopric founded *c.* 1609. The cathedral was burnt down in 1849, but a new one has been built in recent years. It is a university tn. with three colleges, a medical school, and a public library. It is connected with its port, Mollendo, 90 m. distant, by the Arequipa-Puno Railway. The tn. was captured by the Chilians in 1883 during the war between Chile and Peru.

Ares, the Gk. god of war, identical with Mars of Rom. mythology. The son of Zeus and Hera. He loved Aphrodite, and the pair were made a laughing-stock of the gods. He slew Halirrhothius, who had offered violence to his daughter Alcippe, and

was tried and acquitted on the Areopagus by the Olympian gods, which event is believed to have given rise to the name Areopagus. In the Trojan war he was wounded by Diomedes. The Aloidæ also conquered him, and imprisoned him for thirteen months. His temple was on the W. slope of the Areopagus.

Areson, John (1484–1550), a prelate and poet of Iceland. The best known of his poems is entitled *Lamentation on the Passion.* He opposed Protestantism, and fought against Frederick III. of Denmark, was taken prisoner and condemned to death. Printing was introduced into Iceland by him.

Aretæus, a physician of Cappadocia who lived in Rome during the reign of Vespasian. He wrote two treatises in the Ionic dialect, *On the Causes and Indications of Acute and Chronic Diseases,* and *On their Treatment,* which are still extant.

Aretaphia was the daughter of Aeglator, and lived at Cyrene in the second century B.C. She was instrumental in killing both her husband, a tyrant of Cyrene, and her brother Leander. She was offered the crown but refused it.

Arethusa, one of the Nereids: name of sev. fountains, the most famous being in Ortygia, near Syracuse. In botany, a genus of orchids.

Aretinian, or Guidinian Syllables, in music, are those which were used by Guido d'Arezzo, c. 1030, for his hexachords. They were *ut, re, mi, fa, sol, la.*

Aretino, Pietro (1492–1556), *b.* at Arezzo, Tuscany; thought to be the natural son of Luigi Bacci. A writer of satirical sonnets, *Sonetti Lussuriosi,* burlesques, dialogues, and comedies. Banished from his native tn. on account of a sonnet against indulgences. For a time won the favour of the papal court. Was patronised by Giovanni de' Medici, who introduced him to Francis I. of France. His satire of contemporary court life won for him the name of the 'Scourge of Princes.' His comedies are now regarded as his best work, but all his writings are tainted with licentiousness. A translation of his works has appeared in Fr. under the title of *Académie des Dames.*

Aretino, Spinello (1316–1408), a dis... who was *b.* at Arezzo. He was the pupil of Jacopo del Casentino ... obtained a ... e executed ... the life of ... that saint ... chapel of Santa Maria Maggiore, Florence; and the frescoes in the monastery of San Miniato, near Florence, in that of San Bernardo, Arezzo, and in that of Monte Oliveto, near Florence. Six of the frescoes illustrating the life of San Raniero, in the Campo Santo, Pisa, are by A., and are considered by Vasari to be among his best works. In the town hall of Sienna are his works based on the life of Pope Alexander III.

Areus was the son of Acrotatus, ar... m... H... E... ir... against Antigonus Gonatas.

Areus, or Areas, a Pythagorean philosopher of the first century B.C. who was *b.* at Alexandria. He was one of the masters of Augustus, and it was owing to A. that Augustus spared Alexandria when Antony was defeated by him.

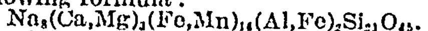
Arezzo: (1) Prov. in Tuscany, Italy. Area 1275 sq. m.; pop. (1928) 305,573. (2) Tn., cap. of the prov., episcopal see of Tuscany. The ancient Etruscan city of Arretium, terminus of the Via Flaminia. 308 B.C. made a thirty years' peace treaty with Rome; was besieged by the Galli Senones 283 B.C. Colonised by Sulla. During the middle ages it sided with the Ghibellines. Defeated by Florence at the battle of Campaldino, 1289; came ... rule, 1384. Dis... n 1800. Guido ... commenced the ... *c.* 1320. The cathedral, 1277, which is It. Gothic, contains beautiful glass windows by Guillaume de Marcillat. There are many notable churches: Sta Maria della Pieve, eleventh century; SS. Annunziata, thirteenth to fourteenth century; S. Francesco, 1322. The tn. is the bp. of many famous men, including Petrarch, Vasari, Pietro Aretino, and Guido of Arezzo. Pop. town 23,010, commune 58,206. Its industries include silk, macaroni, gunpowder, pottery, and tanning. There is a technical school and an academy of science, arts, and letters.

Arfaks Mts. are situated in New Guinea; the highest elevation is 5000 ft.

Arfe: (1) Henrique de A., a distin... mith, who ... e sixteenth ... lver taber... of Leon, ... also that of the Benedictine monastery of Sahagun. (2) Juan de A. y Villafane, *b.* at Leon in 1535, was the grandson of the above, and was employed by Philip II. and Philip III. He was the artist of the tabernacles of Avila, Seville, and Osmas, and he made tabernacles for the cathedrals of Burgos and Valladolid, and for the church of St. Martin at Madrid. He

wrote *Quilatador de Oro, Plata, y Piedras*, Valladolid, 1572; and *Varia Commensuracion para la Escultura y Arquitectura*, Seville, 1585.

Arfredsonite, a dark green mineral which occurs in igneous rocks such as nepheline-syenite and phonolite. Its composition is indicated by the following formula:


$Na_8(Ca,Mg)_3(Fe,Mn)_{14}(Al,Fe)_2Si_{21}O_{45}$.

Argæus, a mt. in Cappadocia, Asia Minor. Extinct volcano, 13,100 ft. high. Now called Arjish-Dagh.

Argali, the name of a species of wild sheep found in the steppes of Siberia and the mts. of Central Asia. It is the 'Ovis Ammon' of Pallas. There are many species in Central Asia, and a similar sheep is found in the Rocky Mts. of N. America and another species in the Himalaya Mts. *See* SHEEP.

Argall, Sir Samuel (*c.* 1580–*c.* 1626), Eng. adventurer, *b.* at Bristol; went to Virginia, 1609; gained the release of several Englishmen held captive by Powhatan, a Potomac chief, by abducting his daughter, Pocahontas, in 1612; destroyed Fr. settlements of Mt. Desert, St. Croix, and Port Royal, in Nova Scotia, in 1613; became deputy-governor of Virginia in 1617 resigning on account of charges of tyranny and rapacity in 1619. In 1621 he commanded a fleet against the Algerine pirates in the Mediterranean; was knighted in 1622; in 1625 commanded an Anglo-Dutch fleet against Spain, and died while with Cecil's expedition against Cadiz.

Argand, Aimé (1755–1803), *b.* at Geneva and *d.* in England; was a chemist who first invented lamps with a burner which admitted air to the flame.

Argand Burner, a burner for an oil lamp, in which the wick is in the form of a hollow cylinder, so that air rises within and without the flame, procuring more complete oxidation and therefore a brighter light. The addition of a cylindrical chimney creates a greater draught, at the same time promoting steadiness of the flame by preventing side draughts. The same principle is used in gas burners where the gas is admitted into the space between two hollow cylinders. This space is closed at the bottom and provided at the top with a series of small holes through which the gas issues.

Argania, a genus of Sapotaceæ containing a single species, *A. Sideroxylon*. It grows in Morocco, and its fruit, unlike that of several kindred genera, is not used for human consumption. It is eaten by cattle, and the seeds yield Argan oil.

Argao, tn. on the E. coast of Cebu, Philippine Is. Founded 1608; pop. 39,121. Products are rice, Indian corn, cacao, and cotton. The language is Cebu-Visayan.

Argaum, in the Deccan, S. India, where Sir Arthur Wellesley defeated the united forces of Sindhia, a Mahratta chief, and the Bhonsla, the Rajah of Berar, on Nov. 29, 1803.

Argeii is a name which Homer sometimes makes use of to describe the whole body of Gks. at Troy. It was probably derived from the inhab. of Argos, which was even then a well-known place. Additional weight is given to this theory by the fact that Argos was used by Homer to designate the whole of the Peloponnesus.

Argel, or Arghel, the *Solenostemma A.*, a species of the order Asclepiadaceæ found in Syria, Arabia, and Africa. Its leathery and acrid leaves are sometimes used in the adulteration of senna.

Argelander, Friedrich Wilhelm August (1799–1875), a famous Ger. astronomer, *b.* at Memel; educated at the university of Königsberg. In 1820 became assistant to F. W. Bessel; was director of the observatory of Abo, 1823, and later of Helsingfors, 1832. Appointed professor of astronomy in the university of Bonn. In 1822 there appeared his treatise on the path of the great comet of 1811, and in 1837 he pub. his researches on the sun's motion in space.

Argemone, a small genus of the Papaveraceæ, or poppy family. There are six species, all natives of Mexico, with prickly leaves; they will thrive almost anywhere, and are cultivated in Britain.

Argens, Jean Baptiste de Boyer, Marquis d' (1704–71), Fr. writer and historian. Pub. *Lettres Juives*, 1738–42; *Lettres Chinoises*, 1739–42, *Lettres Cabalistiques*, 1769; and *Mémoires Secrets de la République des Lettres*, 1743–48. He was *b.* at Aix in Provence, and entered the army at fifteen. Most of his writing was done at Amsterdam. He was invited by Prince Frederick (afterwards Frederick the Great) to Potsdam, but his marriage to Mlle. Cochois, a Berlin actress, offended his patron, and he was obliged to return to France. Died at Toulon.

Argensola, Bartolomé Leonardo de (1562–1631), Spanish poet and historian. He pub. in 1609 *Conquista de las Islas Molucas*; and in 1630 a supplement to Turita's *Anales de Aragón*; in 1634 his poems, which are witty and satirical, appeared with those of his brother. He took holy orders, and was attached to the suite of Count de Lemos. In 1613 he succeeded his brother as historiographer of Aragon.

Argensola, Lupercio Leonardo de (1559–1613), Spanish dramatist and

poet. His tragedy *Filis* is lost; *Isabella* and *Alejandra*, imitations of Seneca, were pub. in 1772. His poems, being translations from Latin poets and some original satires, were pub. with those of his brother in 1634. In 1[illegible] cretary to th[illegible] and in 1610 [illegible] Lemos to Naples, where he *d.*, 1613.

Argenson, Marc Antoine René Voyer, Marquis de Paulmy (1722–87), Fr. diplomatist and man of letters; son of René Louis Voyer d'A. Collected the famous Bibliothèque de l'Arsen[illegible], which [illegible] d'Artoi[illegible] *grande* [illegible]

Arge[illegible]

Arge[illegible], 21 m. by rail S.E. of Ferrara. Pop. about 4700. (2) A city in Pulaski co., Arkansas, U.S.A. Pop. 11,138.

Argenta, Jacopo Filipo, an It. miniaturist of the fifteenth century. He did exquisite work in choir-books, specimens of which are still to be found in the Communal Library at Ferrara.

Argentan, cap. of arron., dept. of Orne, N.W. France; bp. of the historian Mézeray and of Charlotte Corday. Important industries are stained glass and leather work. Pop. 6753.

Argentario, or **Argentaro**, mt. of Grosseto, Tuscany, Italy, forming a peninsula jutting into the Mediterranean immediately W. of Orbetello. Its culminating point is 2082 ft. high. The harbours of Porto Ercole and Porto San Stefano lie at the foot.

Argentera, mt. of Cuneo, Piedmont, Italy, about 10,800 ft. high, forming the highest summit of the Maritime Alps. First ascended in 1879 by Mr. Coolidge.

Argenteuil, in the dept. of Seine-et-Oise, N. France. Pop. 32,173. Manufs. are iron goods, chemical products, and plaster. Asparagus, figs, and grapes are cultivated.

Argenteus Codex, or 'Silver Book,' the name of a manuscript containing the greater part of the four gospels in the Mœso-Gothic language, now in the library at Upsala, Sweden. It was discovered in the abbey of Werden, Westphalia, and is believed to be a relic of the Gothic Bible trans. by Ulphilas, who lived in the fourth century A.D. The leaves are of vellum, the initial letters are in gold, and the others in silver. The Gothic gospels of the 'Silver Book' were first printed in types approaching to a facsimile by Junius, 1665; in Stockholm, 1671; by Mr. Lye at Oxford, 1750; and by Zahn, Weissenfels, 1855.

Argentière, vil. in the dept. of Haute-Savoie, France, 6 m. N.E. of Chamounix. In the vicinity is the famous glacier of A., which is the largest in the Mont Blanc group.

Argentière, L'. (1) A tn. in the dept. of Hautes Alpes, France; pop. 1000. (2) A tn. and dept. in Ardèche, France. The tn. is noted for its anct. church and castle, and also for its fruits, tanneries, and silk factories. There are lead mines in the neighbourhood. Pop.: tn., 2500; dept., 95,000. (3) A glacier of Mont Blanc.

Argentina (Lat. *argentum*, silver), a deep-sea smelt with silvery scales found in Europe. It belongs to the Salmonidæ, and is related to the salmon, trout, and charr. It contains a substance from which artificial pearls are made.

Argentine Republic, a Federal republic of S. America; its name is derived from the R. La Plata (river of silver). It is bounded on the W. by the Andean range of mts., which separates it from Chile; on the N. by Bolivia, and on the N. and E. by Paraguay, Brazil, Uruguay, and the Atlantic Ocean. Area 1,153,119 sq. m.

The country is divided into provs. and ters. There are fourteen provs.: (1) In the N., Salta and Jujuy. (2) On the coast, Buenos Ayres, Santa Fé, Entre Rios, Corrientes. (3) The central provs. of Córdoba, San Luis, Santiago del Estero, and Tucumán. (4) The Andean provs. of La Rioja, Catamarca, San Juan, and Mendoza. The territories are ten in number, and are: (1) Neuquen, Rio Negro, Chubut, Santa Cruz, and Tierra del Fuego, which form the dist. known as Patagonia. (2) Pampa. (3) Misiones, Formosa, and Chaco in the N. (4) Los Andes.

The country is very mountainous and rugged in certain dists. The Andes form a continuous chain of mountainous highland, with an average height of 13,000 ft. S. of Buenos Ayres there is an extensive mountainous range, the Sierra Ventana. The country is well watered, the prin. rivs. being the La Plata, Paraná, Uruguay, Rio Negro, Chubut, and Gallegos. In the N. and E. there are fertile valleys, and wide tracts of lands which for agric. and pastoral purposes could hardly be surpassed. In Patagonia and to the centre there are vast plains known as pampas, which are covered with shingle and interspersed with clumps of thorny brushwood and tall thistles.

The climate for the most part is temperate and healthy. That part of the country which lies N. of the Tropic of Capricorn is extremely hot.

and the southern ters. are bleak and windy. High, stormy winds, known as pamperos, blow on the coast from the Atlantic.

The main industries are agriculture, the pasturage of live-stock and forest products, being 95 per cent. of the whole. Wheat, maize, linseed, and flax are grown, and in Mendoza and San Juan the vine is cultivated and the wine export to other S. American States is increasing, being valued at £500,000 yearly. The Argentine has commerce with practically all the European countries and with the U.S.A., but the great majority of the trade is with Great Britain and France. The prin. exports are: All kinds of cattle products, such as skins, hides, wool, dried salt, and frozen meats; sugar, flour, spirits, dried fruits, maté or Paraguay tea, iron goods, and furniture. The Gov. estimated the industrial production in 1927 at the net added value of £101,000,000.

The minerals of the country might be much more developed than they have been in the past. Some gold is found in Patagonia and in the sub-Andean regions to the N.W. Other minerals are silver, copper, lead, iron, coal, tin, and cement. Tungsten is an important mineral; others are borate, salt, and limestone. Oil has now been found and the Argentine State Oilfields at Comodoro Rivadara produce about five million barrels annually.

Numerous species of animals exist, of which may be named the chinchilla, fox, skunk, guanaco, nutria, biscacha, armadillo, deer, and ostrich. Birds of beautiful plumage abound, as, for example, parrots, flamingoes, and humming-birds. The extensive pasturage of live-stock has greatly decreased the numbers of wild cattle and horses.

Pop. (1926) estimated to be 10,300,000. A census taken in 1774 gives the Buenos Ayres district pop. as 6000. In 1821 it was only 80,000. In 1869, the year of the first regular census, it was 315,000. The extraordinary increase in the past sixty years is explained by immigration. Of the towns of the Pampa, the ports have grown most rapidly: Rosario, 91,000 (1895), 245,000 (1914), 265,[illegible] (1922); Bahia Blanca, 9000 (189[illegible]) 44,000 (1922). The area of greatest density, however, remains the [illegible] area in the Buenos Ayres and [illegible]



(Canadian Pacific

BUENOS AYRES, LOOKING TOWARDS THE HARBOUR

Fé provs., and the old agricult. colonies on the Middle Salado. In 1914 foreigners numbered 30 per cent. of the total pop., all being European except a few tens of thousands of Bolivians and a few thousand Brazilians and Chileans. Immigration is now more under control; in 1919 legislation was passed which requires intending immigrants to produce certificates of good character and ability to work. In 1926 immigrants numbered 340,316; emigrants, 249,475. The general language spoken is Spanish, but there are so many immigrants of different nationalities that there is a variety of languages spoken.

The national religion is Roman Catholicism, but toleration is afforded to other religions.

The constitution is modelled on that of the U.S.A. The president, who must be a Roman Catholic and a born citizen of the Republic, is elected for six years, and is assisted by a vice-president and a cabinet of five ministers. There is a congress of two houses: the senate, composed of thirty members elected for nine years, and the chamber of deputies, composed of 120 members elected for four years. There is also provincial self-government, which is republican in form.

Active service from all men between the ages of twenty and twenty-five is obligatory by the conscription law.

Education is compulsory from the ages of six to fourteen. Primary education is free, being subsidised by the General and Provincial Govs., and secular. Secondary education is also free, but not compulsory. It is controlled by the National Gov. in National Colleges. Normal colleges, mining, agric., commercial, industrial, and training-schools are also sus- ained at public cost. In 1924 econdary, normal and special schools umbered 200—43 secondary, 83 nor- nal, 34 vocational (both sexes). here are over 10,000 schools for rimary instruction, attended by er a million children. There are tional universities at Buenos Ayres d at Córdoba, which latter has an ronomical observatory. There are e provincial universities, the prin- al being at Paraná, Santa Fé, and Plata. The univ. of Cuyo for the rs. of Mendoza, San Luis and San n was founded in 1921.

uenos Ayres, the cap. of the try, on the estuary of the La , was founded by Don Pedro de doza in 1535. It was made a pric in 1620, and a viceroyalty in It is an important commercial ducational centre and owns flour- engineering works. Its pop. in 1905 was over one million. The p tns. are: Buenos Ayres, pop. (19 2,030,765; Rosario (1922), 265,0 La Plata (1928), 165,813; Tucum 91,216; Córdoba (1928), 221,20 Santa Fé, 59,574; Mendoza, 58,79 Paraná, 36,089; Gualeguaych 17,880; San Juan, 16,631.

The rivs. Paraná and Uruguay a important channels of trade. I 1928 there were 22,791 m. of railroa mostly in the hands of British com panies, the British capital sunk bein £234,000,000. The Córdoba Centra Railway, from the capital to Tucumán, is the chief line. There are now over 40,000 m. of telegraphs and over a score of wireless stations (1928), one of which is reserved for communications with England. Several aeroplane services are also in operation. There are tramway lines in all the important towns.

Defence.—According to the Army Regultns., which came into force in 1916, the estab. of the National Militia is approx. 1500 officers, 3000 non-commissioned officers, 2800 volunteers and 21,000 conscripts called up, the Army being organised in five Divisions, three Cavalry Brigades, and two Mountain detachments. The trained reserve numbers 300,000.

The A. R. has not produced many great names in the realm of literature and science. Gregorio Funes (1749–1830), rector of the university of Córdoba, was an eminent historian, who won a reputation not merely in his own country, but in the U.S.A. and in Europe. President Sarmiento, during his term of office (1868–74), founded the observatory at Córdoba. The first director of the observatory was Benj. Apthorp Gould (1824–96), a scientist of the first rank, whose brilliant research work did much to kindle an interest in scientific matters.

The gold peso is the unit of value, and equals 96·5 cents. By a law passed in 1899, the paper peso equals ·44 of the gold peso. The revenue of the country is chiefly derived from customs and excise, which are heavy. The country has suffered from the unscrupulous use of national credit to promote private enterprise. The internal troubles of the last half-century have caused frequent financial panics, with consequent forcing of paper currency. Now all banks, national and provincial, are under the direct control of the State, and more prosperous times are hoped for.

The country was first visited by Spaniards in 1516. A company of adventurers, under the leadership of Juan Diaz de Solis, landed near the Rio de la Plata in search of a passage south-westward to the E. Indies. Four years later the Spanish King

the dissatisfaction of the remaining Sp. adherents. In 1826–28 war was waged with Brazil for the possession of Uruguay. The Brazilians were defeated at Utuzaingo, and Uruguay became independent under the name of Monte Video; in 1838–42 there was war with France; and in 1865–70 occurred the Brazilian-Argentine War against Paraguay, due largely to the arrogance of Francisco Solano Lopez, president of Paraguay, who had invaded A. territories. He was defeated and killed in 1870 by Mitre, the A. president and general, and peace was restored.

Up to comparatively recent years the country was harassed by internal revolutions, which frequently involved a general financial crisis. Towards the end of the nineteenth century the relations between Chile and the A. were embarrassed by quarrels as to the boundaries. The A. prepared for war by increasing its navy. The boundary protocol was signed with Chile in Dec. 1900. In the following year the two countries referred the question of the frontier to the arbitration of Great Britain, and in consequence war was averted.

The death of President Manuel Quintana took place in March 1906, when the vice-president José Figueroa Alcorta assumed presidential office. He was succeeded in 1910 by Roque Sáenz Peña, with Victoriano de la Plaza as vice-president.

On May 25, 1900, the A. R. celebrated the centenary of its independence, on which occasion the Infanta Isabel of Spain and representatives of the U.S.A. and the European powers were present.

History since 1914.—Throughout the Great War A. remained neutral, though the bulk of the pop. sympathised with the Allied cause. The volume of trade with Germany, though inferior to that with Britain, was great, and the Ger. element in the pop. was by no means negligible. Moreover the Ger. communities were well organised to meet all [illegible] ties, and Brit[illegible] in A. being [illegible] had but little [illegible] preserving the *status quo*.

One of the most significant events in A. history in these years was the election of the Radical leader, Dr. Hipolito Irigoyen, to the office of President. Never previously had the Radicals secured control of the Gov. in so proudly conservative a country as the A. During 1917 a serious railway strike, probably fomented by Ger. agitators brought about acute political tension. Irigoyen's democratic sympathies were said to have indirectly encouraged the outbreak. About this time the notorious *spurl versenkt* warning as to Ger. U-boat intentions was sent to the A. Gov. (see LUXBURG). Several A. boats were in fact sunk. The U.S.A. had joined the Allies. Feeling ran high in the A., but though numerous volunteers migrated to join the Allied Armies neutrality was preserved.

It is considered by most Pan-Americans to be an outstanding achievement of the President that in spite of the strongest inducements from outside to join the Allies he kept A. out of the Great War. This abstention has enabled the country to make headway in commerce, and, in 1928 the foreign trade was valued at close on two milliard gold pesos, being an increase of 15 per cent. over that of the previous year. Imports in 1928 amounted to 848 million gold pesos and exports to 1030 million gold pesos, so that the visible favourable balance of trade was appreciable. In domestic affairs the chief features of Irigoyen's first administration were the introduction of a minimum wage to save the working classes from the effects of an inflated currency, the raising of the railway tariff, and the unswerving support of national and provincial constitutions. Irigoyen had been the chief political force in A. ever since he assumed a commanding position forty years ago in the Provisional Gov. of that time, and this in spite of his marked disinclination for office. He at first stoutly refused to stand for the presidency, partly, perhaps, because he under-estimated the chances of his party and partly because his immense estates occupied so much of his attention. He was, however, again inaugurated president in 1928 and but for the Revolution of 1930 would in the ordinary course have held office till 1934. The most significant event in the foreign policy of A. in recent times is the unequivocal championship of the complete sovereignty of the S. American Republics, untrammelled by any implications or even by the mere existence of the Monroe doctrine. This policy, which was repeated at the Havana Conference of Pan-American States in 1928, taken in conjunction with the bitterness induced by the Fordney-McCumber tariff against A. goods, might conceivably have led to strained relations between the two nations, but the assumption that the president himself endorsed this conception of the Monroe doctrine would seem to be rebutted by the resignation of Dr. Pueyrredon, the A. Ambassador to Washington, after taking a leading part in the Havana Conference. In 1930 a revolution took place, which ended the gov. of

President Irigoyen. The *coup-d'état* was effected by a combination of all the fighting services directed by a junta under General Uriburu. The course of the revolution was swift and accompanied by relatively small loss of life and damage to property. On Friday, Sept. 5, Dr. Irigoyen had delegated his powers to the vice-president, Señor Martinez, who had at once proclaimed martial law. The next day the Army forces stationed at Campo de Mayo and San Martin, joined by civilians, marched on the Federal capital. The President fled to La Plata, where he and his Cabinet resigned on the same day. Dr. Irigoyen then surrendered to the military forces, but his immediate release was ordered by the junta. By Saturday night the situation was normal but 22 persons had been killed and 200 wounded in rioting in Buenos Aires, when damage was done to the property of the ex-President and of his supporters. On Sunday the junta was sworn in as the Provisional Gov. with General Uriburu as provisional President. The new Gov., the members of which were all men of marked Conservative tendencies, dissolved parliament but promised to respect the Constitution. The cause of Dr. Irigoyen's downfall was, apparently, popular discontent with 'one-man rule' bordering on dictatorship, a discontent aggravated by economic depression, much the same causes as had led to similar forcible changes in the Govs. of Bolivia and Peru a few weeks earlier in the same year.

Argentine, tn. of Wyandotte co., U.S.A., on the Kansas R., 4 m. W. of Kansas city, became part of the latter in 1910.

Argenton-sur-Creuze, a tn. of W. France, dept. of Indre; pop. 5575. Manuf. of shoes and linen goods. Excellent wine is produced.

Argillaceous (Gk. ἀργίλλος, clay) **Rocks** is a term applied to those rocks which are formed entirely or partially of clay (*q.v.*).

Argives, a name given to the Gks.; derived from the city of Argos, which is reputed to be the oldest city of Greece.

Argo, 'the ship,' is the largest of Ptolemy's fifteen southern constellations. It is so large that much confusion prevailed formerly as to the names of its different parts. To obviate this difficulty Sir John Herschel suggested its div. into *Carina*, 'the keel'; *Puppis*, 'the stern'; *Vela*, 'the sails,' and *Malus*, 'the mast.' A part of Malus was called by Lacaille, *Pyxis*, 'the compass.' The greater part of the constellation which lies E. of Columba and Canis Major is not visible in Britain, and it is this part which contains all the more important stars. Canopus is the only star in A. of the first magnitude, but at least two new stars temporarily outshone it. The variable star of Carinæ in 1843 was brighter than Canopus. It has a rapid decline in luminosity, and it now appears stationary with a magnitude of 7·5. The constellation is named after the ship *Argo*, which conveyed Jason and his companions to Colchis, the story of which is told in the article ARGONAUTS. The Hindoos regarded it as the ship of the sun, while the Egyptians regarded it as the bark of the moon. The name by which this constellation was sometimes known in Europe until about three centuries ago was the Ark, a name which may be traced to the tradition in anct. Egypt that the gods Osiris and Isis surveyed the deluge from this stellar ship.

Argol, the crude product deposited on the bottom of a cask during alcoholic fermentation. It is used for the preparation of 'cream of tartar' and tartaric acid. The A. is partially purified by recrystallisation from hot water, is dissolved in water and boiled with chalk, when calcium tartrate, $CaC_4H_4O_6$, is precipitated. After washing, the tartrate is treated with sulphuric acid, which sets free the tartaric acid. A. is also a Mongolian term for dried dung used as fuel.

Argolis, *see* ARGOS.

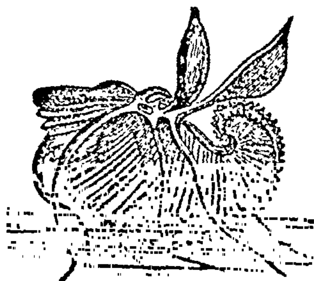
Argon (Gk. ἀργός, inactive), a gaseous constituent of the atmosphere. Up to 1894 it was generally assumed that the atmosphere contained oxygen and nitrogen, with variable quantities of carbon dioxide, hydrogen, water-vapour, ammonia, etc. It is true that Cavendish had in 1785 suggested the existence of a small proportion of another constituent, but little notice was taken of the suggestion until Lord Rayleigh and Professor Ramsay demonstrated the existence of A. in 1894. Cavendish had added excess of oxygen to air and passed electric sparks through the mixture collected over caustic potash, so that nitrous acid was produced and absorbed. He then absorbed the excess of oxygen with 'liver of sulphur,' and found a small bubble of unabsorbable gas remaining. Over a hundred years later Lord Rayleigh determined with great care the weight of one litre of oxygen, of hydrogen, and of nitrogen. The results obtained in connection with atmospheric nitrogen were consistent one with the other, but when nitrogen prepared from ammonia was used, an unexplainable error of about one-half per cent. was encountered. In 1894,

Rayleigh and Ramsay in association proved that the difference was due to the presence in the atmosphere of an inert gas heavier than nitrogen.

A. may be prepared from atmospheric nitrogen in three ways: (1) by passing it over red-hot turnings of magnesium; (2) by sparking the gas with excess of oxygen in the presence of caustic alkali; or (3) by dissolving the more soluble argon in water.

As its name implies, A. is an inactive gas, and all attempts to obtain combination with other elements have failed. Its density (H = 1) is 19·82. It has been condensed to a colourless liquid which boils at − 187° and freezes at − 189·6°.

Argonautidæ (Gk. Ἀργώ ναύτης, sailors), a family of cephalopodous molluscs of the order Dibranchiata and div. Octopoda. They are cuttle-fish,



ARGONAUT

among whom the males are very small and the females, which are much longer, bear a thin shell to hold their eggs. *Argonauta argo*, the paper-nautilus, or paper-sailor, is found in the Mediterranean; *A. tuberculata* in the Indian Ocean.

Argonauts, Gk. heroes, who accompanied Jason in his quest of the Golden Fleece. Æson, King of Iolcus in Thessaly, was deprived of his kingdom by his half-brother Pelias. His son Jason, when he grew up, demanded the throne, which Pelias promised to surrender if Jason would bring the Golden Fleece from Colchis, where it was guarded night and day by a dragon, in the oak grove of Ares. Jason ordered Argus to provide him with a ship with fifty oars, the building of which was superintended by Athena. This ship was called *Argo*, after its maker. Jason embarked with the great heroes of the age, such as Castor and Pollux, Hercules, Theseus, and Orpheus. Æsculapius was their physician, Tiphys the pilot. Their number is variously given as forty-five, fifty, and fifty-four.

The A. landed first at Lemnos, an is. inhabited by women who had murdered their husbands. There they remained two years, and raised a new race of men called Minyæ. They next visited Samothrace and Bebrycia, whence they were driven by a storm to Salmydessa, where they delivered the land from the persecution of the Harpies.

After many adventures, both by land and sea, they came to Æa, the cap. of Colchis. The king, Æëtes, promised to give up the Golden Fleece if Jason would yoke two fire-breathing bulls with brazen feet to a plough, and sow the teeth of the dragon which Cadmus had not used at Thebes. This Jason accomplished through the help of Medea, the king's daughter, who loved him. She provided him with the means of resisting fire and steel, and gave him a drug which lulled to sleep the dragon that guarded the Golden Fleece. The A. fled with their spoil, taking Medea with them, and were pursued by Æëtes. In order to hinder her father in his pursuit, Medea seized her brother Absyrtus and strewed the way with his mangled limbs. Zeus, angry at the murder of Absyrtus, raised a storm which drove the *Argo* to the is. of Circe, who refused to absolve Jason.

The A. continued their journey and were guarded through the straits of Charybdis and Scylla by Tethys, the mistress of Peleus, one of their company. They sailed safely past the Sirens, who sang in vain, for Orpheus surpassed them. At the is. of the Phæacians they encountered King Æëtes and his fleet. The wife of Alcinous, king of the country, was chosen to arbitrate between the Colchians and the A. Secretly by night she had a marriage consummated between Jason and Medea, and in the morning declared that Æëtes' claim to his daughter was void.

After many disasters the *Argo* arrived in the Peloponnesus, where Jason was purified of the murder of Absyrtus, and finally reached Thessaly in safety.

There are many versions of this story. [illegible]

cerning the early Mediterranean seafarers and merchants.

Argonne, a forest and hilly dist. of France in the anct. provs. of Lorraine and Champagne. It is included in the depts. of Meuse, Marne, and Ardennes. Its chief tns. are St. Menehould (the ancient cap.), Clermont, Varennes, Beaumont, and Grandpré.

During the Great War, the A. was

the scene of bitter fighting against the forces under the Crown Prince of Germany, whose advance in Sept., 1914 was finally stopped by General Sarrail. In July 1915 the Crown Prince unexpectedly advanced his lines a quarter of a mile against superior odds, and thereby enhanced the fears of the Allies that through shell shortage they might be unable to resist the great Ger. drive of the summer of 1915. But the Fr. arrested his further advance. Therefore things came to a stalemate on this sector of the front; but the Gers. did not remain idle. The Argonne is a maze of forests, streams, gullies and ravines. The Gers. took full advantage of this, not only constructing their Kriemhilde system of trenches as a continuation of the famous Hindenburg line, but, profiting by the terrain, built cement 'pill-boxes' for machine-guns over the entire section of the Argonne which they held. This stalemate was finally broken in the autumn of 1918, when Marshal Foch yielded to the insistence of General John J. Pershing, Commander-in-Chief of the American troops, that the American soldiers should be given a large share in the fighting. The battle, which lasted for weeks, will be for ever memorable in American annals, because more American troops were engaged in it than ever fought under the Stars and Stripes at one time in any of the nation's wars. Twenty-two American divisions were engaged, with a total strength of over 625,000 men. General Pershing had 660 American and 180 Fr. aeroplanes. The total strength of the American and Fr. guns at his disposal was well over 2500. The enormous importance of this battle was that it was calculated to bring the strongest pressure to bear upon the Gers. at this point at the moment when General Haig was hammering away successfully at the Hindenburg line. If the Americans and the Fr. troops, who were also engaged in this action, should succeed in piercing the Argonne, they would threaten one of the most important series of railway lines upon which the Ger. armies depended not only for supplies and reinforcements, but also for withdrawal in case of defeat. There was danger to them that they might be caught between 'pincers' represented on one side by Haig's British armies and on the other side by the combined Americans and Fr. The Americans displayed the greatest bravery, but many of them were young untried troops, who in the advances failed properly to 'mop up' the enemy trenches, as did the more experienced veteran British and Fr. troops. This cost them dearly in dead and wounded, and often held up their forward rush.

The objective set the Americans was to pierce the Forest of Argonne and advance up the W. bank of the Meuse, at the same time that the Fr., under Gouraud, advanced W. of the Argonne. On the Ger. side forty-six divisions were employed, of whom twenty-seven were used against the Americans. The thrust was so dangerous that, hard-pressed as Ludendorff was all along the line, he had to throw in troops sorely-needed elsewhere. He had one big advantage in that the Gers. were on the defensive behind extensive works. He could therefore defend with far fewer troops than his enemies needed for the attack. The American attack opened with great *élan* on Sept. 26, on a front of 18 m., and so successful was it that the Ger. official communiqués admitted that their front artillery lines had been reached and that on the second day Montfaucon, dominating a great stretch of country, had been taken. The booty was 100 guns and 8000 prisoners. Owing to the fact that the Americans had few light railways in their sector and that their motor service of supply was hampered by bad roads, their advance was slowed down and part of the front line ran short both of ammunition and food. But by Oct. 4 these defects had been largely remedied, and the advance was once more resumed through what the Gers. considered to be an impregnable forest. By Oct. 14 the Americans had captured Romagne, had broken through the Kriemhilde line at various places, and were approaching the partially completed Freya line. General Pershing now divided his forces into two armies, the First under General Liggett and the Second under General Bullard (*q.v.*). In each of these there were Fr. as well as American corps. By Oct. 29 Marwitz, commanding the Gers., fell back on the Meuse and blew up some of his ammunition dumps. By Nov. 2 the whole of the Argonne was cleared, the troops had passed through the Freya line and had reached Buzancy. According to the plan agreed upon between Marshal Foch and General Pershing the troops were to push on to Sedan and cut the important railway network. American heavy guns began firing at long range at some of the important railway junctions. By Nov. 6 Fr. and American troops had reached the suburbs of Sedan, the town itself being full of retreating Ger. soldiers. Just as in the war of 1870 the Gers.

had trapped an entire Fr. army there, so now it seemed as if the Fr. and Americans would turn the tables on to the Gers. The latter, indeed, were only saved by the Armistice of Nov. 11. The American casualties in this long-fought battle were 115,529, of which number 15,599 were killed. In all, the combined American and Fr. armies captured nearly 18,000 men and 468 guns.

Argos, anct. city of Peloponnesus. In the Homeric age it was overshadowed by Mycenæ, but during the reign of Pheidon (770–730 B.C.) its supremacy extended over the whole of the eastern Peloponnesus. Engaged in frequent wars with Sparta: 461 B.C., alliance with Athens; 229 B.C., governed by tyrants supported by Macedon; 146 B.C., subjugated by Rome; A.D. 1210, captured by the Franks. During the eighteenth century the scene of many conflicts between the Venetians and Turks. ... excavations have ... he Heræum, or ... many interesting pieces of sculpture, etc.

Argos, in Amphilochia, was a tn. near the Gulf of Arta. The ruins at the bottom of the Gulf of Karavasara are supposed to be those of A.

Argosie, a large ship either for merchandise or war. According to Rycaut in *Maxims of Turkish Polity*, chap. xiv., they derived their name from Ragosies, *i.e.* the ships of Ragusa, but it is more probable that the A. derived its name from the ship *Argo*.

Argostoli, cap. of Cephalonia, one of the Ionian Is. Pop. 7871. See of the Gk. Church. The tn. has a fine quay and harbour. There is a curious stream flowing *from* the sea, which is used to drive mills. The chief industries are shipbuilding and silk-spinning. The ruins of Cranii still remain.

Argot, *see* SLANG.

Arguelles, Augustin (1776–1844), *b.* at Ribadesella, Asturias, Spain. Liberal statesman, an eloquent member of the Cortes. Suffered imprisonment 1812–40, till the revolution, when for a year he acted as minister of the interior. Exiled to England 1823–32. On his return to Spain, appointed guardian of Queen Isabella, and vice-president—afterwards president—of the Chamber of Deputies.

Arguin, a small Fr. is. off Cape Blanco, Africa. A. Bank is very dangerous for ships, and was the scene of the ...

... reasoning which is given in support of a proposition. (2) Synopsis, contents of a book, outline of a poem or play. (3) In logic, the middle term in a syllogism. (4) In mathematics, the angle, arc, or other quantity upon which the required quantities are made ... the ... of a ... epicycle.

Argun, riv. of Asia. Rises in Great Kinghan Mts., W. Manchuria, and flows N., forming the boundary between Russian and Chinese dominions and joining the Shilka to form the Amur. Length 440 m.

Argus, of Gk. mythology, son of Arestor, surnamed Panoptes, 'All-seeing,' because he had one hundred eyes, of which only two were asleep at one time. Appointed by Hera to be guardian of Io, whom Zeus had ... s commanded ... leep with his ... Hera transplanted his eyes to the tail of the peacock.

Argus Pheasant, the *Argus giganteus*, a galliform bird of the order Neornithes, so called because its long tail-feathers bear ocellated spots. It is a native of the Malay Peninsula and Sumatra.

Argyll, Dukes of. The dukes of Argyll are descended from the Campbells of Lochaw, who were created barons with the title of Baron Campbell. The earldom was created by James II. in 1457, who conferred it on Lord Campbell (*d.* 1493), from whom the greatness of the family dates. The second earl was killed at Flodden, the third earl *d.* in 1530, whilst the fourth earl was the first of the great Scottish nobility to become Protestant. The fifth earl was one of the 'lords of the congregation,' but is later found on the side of Mary Queen of Scots, whose troops he commanded at the battle of Langside. After her defeat he again became friendly with the regent Murray, and ultimately became lord high chancellor of Scotland. He *d.* in 1573. He was succeeded by his half-brother, who *d.* in 1584, and his successor spent the greater part of his time in fighting for Philip III. ... eighth earl ... in 1598 and ... f the estates ... the head of 20,000 retainers. He boldly opposed the church policy of the king (Charles I.) in Scotland. He became exceedingly powerful, and in 1640 the king was practically forced to create him a marquess. An attempt was made to kidnap him with two other Scottish leaders—the 'Incident' in 1641. He was instru-

mental in the completion of the alliance between the Parliament and the Scots in 1643. He defeated several royalist risings in Scotland; fought a campaign against Montrose in Argyllshire. He was defeated by Montrose at Inverlochy and also witnessed the victory at Kilsyth. He negotiated with the king after the surrender at Newark and attempted to moderate the parl. terms. He lost power when the king was beheaded, and although he supported Charles II. in his attempt to regain the crown, his power passed to the Hamilton family. For complicity in parl. plots he was executed in 1661.

Archibald Campbell, ninth Earl of Argyll, eldest son of the eighth earl, fought at Dunbar on the royalist side. Was omitted from the Act of Grace of 1654, and, although he submitted, was a prisoner from 1657 to 1660. He was raised to favour and high position by Charles II. He refused to sign the new test in 1680, making a special reservation, and was tried for treason and condemned to death 1681. He escaped to Holland, and there agreed to the Monmouth plot, and, crossing to Scotland, tried to raise the Campbells. He failed, and he was captured and beheaded on the old charge of treason 1655.

Archibald Campbell (*first Duke*), *d.* 1703, was an active promoter of the Revolution of 1688. He was deputed to tender the crown of Scotland to William III. in 1689. Organised the massacre of Glencoe, 1692. In 1701 he was created first duke.

John Campbell (*second Duke*). One of the great founders of the union. His services in this respect were recognised by the bestowal of the title Earl of Greenwich. He was a famous soldier, and fought at Oudenarde. Later in the war he took command in Spain. He was deprived of his offices on his return for his outspoken criticism of the ministry. Restored to favour under George I., he was instrumental in putting down the '15 with so little bloodshed. He was an outspoken and brilliant orator, but his oratory brought him often into disgrace. He continued his public life until 1740, when he resigned his appointments and retired into private life. He *d.* in 1743.

George John Douglas Campbell (*eighth Duke*), *b.* in 1823, succeeded his father in 1847. He rapidly became a well-known Liberal politician. He was lord privy seal, 1852; postmaster-general, 1855; secretary of state for India, 1868, and during his period of office did much to bring on the second Afghan War. In 1871 his son married the Princess Louise, fourth daughter of Queen Victoria. He resigned office in 1881 (lord privy seal) on the question of an Irish Land Bill. He was also an opponent of Irish Home Rule. He *d.* in 1900. Amongst the books that he wrote are *The Reign of Law, Primeval Man, The Unity of Nature.*

John Douglas Sutherland Campbell (*ninth Duke*) succeeded his father 1900. He married in 1871 H.R.H. the Princess Louise. He was governor-general of Canada 1878–83. Represented S. Manchester from 1895 to 1900 as a Unionist. Is known also as a writer of both prose and poetry. He *d.* in 1914.

Argyll and Sutherland Highlanders (Princess Louise's). This regiment, which combines the former 91st (Argyll) and 93rd (Sutherland) Foot, raised respectively in 1794 and 1799, was augmented to twenty-seven battalions in the Great War. Its death-roll in the war was 6442. In the heavy fighting round Zonnebeke and Ypres in 1914 the regt. suffered tragic losses near Fromelles (2nd Batt.). It was also conspicuous in the Ypres battles of 1915 (7th Batt.) and at Loos (2nd Batt.). The 1st Batt. was at Salonika in 1916 and in that year the 2nd, 6th, 8th, 10th and 11th Batts. were all engaged in severe fighting in the Somme battles, notably at Martinpuich and Delville Wood; at Arras in 1917 the 11th Batt. suffered losses and other batts. were distinguished for their fine resistance at the Roeulx Chemical Works near the Menin Road (May 1917) and especially in the Vaux-Vraumont sector in 1918 (14th Batt.). Their battle honours before the Great War included the Cape of Good Hope (1806), several battles of the Peninsular War, South Africa (1846–47, 1851–53), the Crimea, Indian Mutiny, S. Africa (1879) and the Modder River and Paardeberg. In 1930 H.R.H. Princess Louise became Colonel-in-Chief of the allied A. & S. H. of Canada.

Argyllshire, a maritime co. in W. of Scotland. The land is cut up into many peninsulas and is., and there are numerous lochs and inland bays. The greatest length is 115 m., and the greatest breadth 55 m. The coastline measures 2289 m., no part of the co. being more than 12 m. from the sea or from a large inland loch. Area 3213 sq. m., of which 623 belong to the is. The country is rugged and mountainous, and contains some of the most picturesque scenery in Scotland.

Climate, rainy and bleak. Winds S.W. and S.E. Average rainfall at Oban per annum 64·18 in. Average rainfall at Upper Glencoe per annum 127·65 in. The average yearly temp. is 48° F. The co. is divided into dists.,

viz. Cantire, N. and S. Argyll, Lorn, Appin, Cowal, Morven, and Sunart. There are numerous is., of which may be mentioned Mull, Islay, Jura, Tyree, Coll, Colonsay, Iona, and Staffa. The highest peaks are Bidean nam Bian, 3766 ft., and Ben Cruachan, 3689 ft. The prin. lochs are Moidart, Sunart, Linnhe, Fyne, and Long, and the fresh-water lochs Awe and Lydoch. Loch Awe is famous for its salmon and Loch Fyne for herrings. There are no navigable rivers. The Awe and Orchy are short, rapid streams. There are many beautiful glens, *e.g.* Glen Aray, Strae, Croe, Glencoe (famous for the massacre in 1692), and Glen Lochy (the 'wearisome glen'). The co. is a favourite of sportsmen, there being plenty of deer and game. The land belongs principally to the Duke of Argyll and the Earl of Breadalbane. The chief industry is sheep- and cattle-rearing. Woollens for home use are made near Inveraray. Gunpowder is manufactured at Melford and Furnace, whisky at Campbeltown and Oban. Fishing is an important industry. Easdale and Ballachulish quarries supply excellent roofing slates. Some coal is found near Campbeltown; lead at Strontian, and in Islay and Coll; granite near Inveraray. Other minerals are copper, marble, and limestone. A branch of the L.M.S. Railway runs from Tyndrum to Oban. The former W. Highland Railway from Glasgow to Fort William was opened up in 1894. Frequent steamers run from Glasgow. The Crinan Canal was built 1793–1801. The co. returns one member to parliament. Pop., which had been decreasing for a century, owing to emigration, principally to Canada, was 70,902 in 1911, but in 1921 it was 76,862, but probably this number included a large number of tourists and visitors to Oban.

Argyro Castro, a tn. in Albania, Turkey in Europe, situated in the valley of the Deropul, a branch of the Bojiessa, or Vouissa. It contains a castle, a mosque, and barracks. Taken by Ali Pasha in 1812, it was afterwards surrendered to the Turks. Pop. 11,733.

Argyropulos, Joannes (1416–86), a Gk. scholar, one of the early promoters of the revival of learning, *b.* at Constantinople; 1434 rector of the University of Padua; 1456 professor of Gk. in the University of Florence. Translated Aristotle.

Argyropulos, Pericles (1809–60), *b.* at Constantinople. Gk. publicist and promoter of constitutional state reform; 1837 professor of jurisprudence, University of Athens; 1843 elected to chamber; 1854–5 minister for foreign affairs.

Ari, Thorgilsson (1067–1148), historian of Iceland, surnamed 'Fr... or 'The Wise.' One of the first to commit the Norse sagas to La... He began the *Landnamabok*, a his... of the settlement of Iceland, c... tinued by later writers; and wr... the *Konungabok*, a history of Norw... the *Islandingabok*, an account of ... Icelandic laws; and the *Kristni Sa...* an account of the conversion of I... land to Christianity.

Aria (It.) = air. Used in music ... signify melody as distinct from ha... mony, especially with regard to ... single voice or instrument that ... accompanied by other voices or in... struments. Recognised as a definit... art form by Monteverde in the seven... teenth century. This binary form of melody is matured in the work of Scarlatti and Handel.

Aria was one of the E. provs. of the anct. Persian empire, forming a part of Ariana. It was bounded on the N. by Margiana and Bactriana, on the E. by Paropamisadæ, on the S. by Carmania, and on the W. by Parthia. It was the site of the modern Seistan and the S. part of Khorasan. It is described by Strabo (xi. c. 10). He says it is watered by the Rs. Arios and Margos, and the Margos is supposed to be the modern Murghab. According to Herodotus, iii. 93, the Parthi, Chorasmii, Sogdi, and Arii formed the sixteenth satrapy into which Darius divided the Persian empire; and in vii. 62 he says that Arii was the anct. name of the Medi. Alexandria Ariôn in A. was founded by Alexander the Great, and is supposed by some to be the present Herat.

Ariadne, daughter of Minos II. of Crete by Pasiphaë, fell in love with Theseus, to whom she gave a thread by which he extricated himself from the labyrinth and escaped from the Minotaur. He accordingly married her, but deserted her in the is. of Naxos. There she was found by Dionysus, who placed among the stars the crown he gave her at their marriage.

Ariana, the general name given to the E. provs. of the anct. Persian empire, stretching from Media to the Indus, and bounded on the N. by the Indian Caucasus and on the S. by the Arabian Sea.

Ariano, episcopal see, belonging to Campania, Italy. An anct. Samnite tn. formerly called Acquum Tuticum. Pop. 9399. Frequently devastated by earthquakes.

Arians, *see* ARIUS.

Ariarathes, the name of sev. kings of Cappadocia: (1) Son of Ariamnes I., defeated and slain by Perdiccas 322 B.C. (2) Son of Holophernes, and nephew of A. I., became king 315 B.C.

(3) Son of Ariamnes II. and grandson of No. 2, died 220 B.C. (4) Son of No. 3, reigned 220–162 B.C., and assisted Antiochus the Great against the Romans, and obtained peace in 188. (5) Son of No. 4, surnamed Philopator, reigned 163–130 B.C. He was expelled by Demetrius Soter, but was restored by the Roms., whom he helped against Aristonicus of Pergamus. (6) Son of No. 5, reigned 130–96 B.C., and was put to death by Mithridates. (7) Son of No. 6, also murdered by Mithridates, who then reigned. (8) Second son of No. 6, was deposed by Mithridates. (9) Son of Ariobarzanes II., reigned 42–36 B.C., and was deposed and put to death by Antony.

Arias, Antonio (1610–84), a Spanish painter who was *b.* at Madrid. He studied under Pedro de Las Cuevas, and as a boy distinguished himself as a painter. His most remarkable picture is that of the 'Denarius of Cæsar' at Prado.

Arias, Montanus (1527–98), Spanish orientalist, *b.* at Fregenal de la Sierra, in Estremadura. Studied at the universities of Seville and Alcala and took orders in 1559; 1562 consulting theologian to the Council of Trent; 1571 pub. a commentary on the minor prophets; 1568–73 ed. the Polyglot Bible at Antwerp; 1575–6 tried at Rome of a charge of heresy, and acquitted.

Aribert, or Heribert, of Lombardy, Archbishop of Milan, 1018–45. He was one of the leaders of the Ghibelline party, and in 1026 crowned the Emperor Conrad II., whom he had invited to Italy, as King of Milan.

Arica, seaport tn. of prov. of Tacna, . Chile, about 40 m. S. of Tacna by ..ll. It is the prin. port for Bolivia, ..d exports copper, guano, silver, ..lt, etc. The tn. was the subject of .. long dispute between Chile and ..ru, which led to mediation by the ..S.A. The settlement, accepted by ..h countries in May, 1929, awarded ..ca to Chile and Tacna to Peru. .. prosperity of the tn. has been ..inished by frequent earthquakes, ..hich the chief occurred in 1868; .., once 30,000, now about 9000.

..richat, seaport of Nova Scotia, ..mond co., on Isle Madame. It ..seat of a Roman Catholic bishop ..possesses a good harbour, from ..h there is some fishing; pop. ..e dist. 3309.

..icia, an anct. tn. of Latium, on ..ppian Way, 16 m. from Rome. ..8 B.C. it was subdued by the .., and received the Rom. fran.. In its neighbourhood was the ..ated grove and temple of Diana .., on the borders of the Lacut ..ensis. Her priest, called 'rex nemorensis,' was always a runaway slave. In order to become her priest he had to slay the existing holder of the office in single combat.

Aricina, *see* ARICIA.

Ariège, a dept. in the S. of France, bounded on the S. by Catalonia and Andorra, W. by Haute-Garonne, N.E. by Aude, and S.E. by Pyrenées-Orientales. The E. part is watered by the A., the W. by the Salat. Both rivs. later join the Garonne. Offshoots of the Pyrenees, which lie on the S., cover a large part of the dept. The chief industries are agriculture and vine-growing, iron-mining, and woollen manufacturing. Cap., Foix; area, 1890 sq. m.; pop. 177,393.

Ariel, a word signifying 'lion of God' or 'altar of God,' is in Isaiah xxix. 1 applied to Jerusalem. In later Jewish times the name is given to a water spirit. One of the fallen spirits in *Paradise Lost* bears this name. *See also* Pope's *Rape of the Lock* and Shakespeare's *Tempest*. In astronomy, one of the satellites (the inmost) of Uranus.

Aries, or the Ram, is the first of the anct. zodiacal signs. The Gk. mythology makes A. to be the commemoration of the Golden Fleece, in quest of which the Argonautic expedition was undertaken.

Arietta (the diminutive of the It. word *aria*), in music, a short air.

Arikara, a Caddoan tribe of N. American Indians, formerly belonging to the Pawnees. They originally lived on the Missouri, but were driven out of their own dist. by the Sioux, and were later with the Mandans and Grosventres on the Fort Berthold reservation in N. Dakota. They now number a few hundreds. *See* Dorsey's *Traditions of the Arikara*, 1904.

Arillus, or Aril, in some plants forms an exterior appendage to the seed. It develops after fertilisation, proceeding from the placenta, and partially invests the seed, after which it falls spontaneously. The mace of the nutmeg and the scarlet covering of the seeds of the climbing bitter-sweet, are true arils.

Arimanes and Areimanios are Gk. corruptions of the Persian name Ahriman or Aheriman. *See* AHRIMAN.

Arimaspi, a mythological people of Scythia, inhabiting the E. coast of the Caspian Sea. According to the fable, they had but one eye, and were engaged in perpetual warfare with the griffins for the gold rolled down by the R. Arimaspius.

Arimes were an anct. people of Asia Minor known to the Hebrews as the Aramæans. In the western countries the A. were considered as monkeys, which fact caused them to be confounded with the Cercopes, when

Jupiter had turned into monkeys. Amongst the old Gk. poets they were a mythical people, and Arima was the scene of the punishment of the monster Typhœus.

Arinos, a riv. in Brazil, joining the Tapajoz, a trib. of the Amazon.

Ariobarzanes: I. The name of kings of Cappadocia: (1) Surnamed Philoromæus, reigned 93-63 B.C., being elected king by the Romans. During his reign he was sev. times expelled, but was finally restored by Pompey shortly before his death. (2) Surnamed Philopator, became king after his father, 63 B.C., but was assassinated in 51. (3) Surnamed Eusebes and Philoromæus, succeeded his father in 51 B.C., and reigned until 42, when he was slain by Cassius. II. The name of kings or satraps of Pontus. (1) Who reigned *c.* 400 B.C. (2) Son of Mithridates I., reigned 363–337 B.C. He revolted against Artaxerxes in 362. (3) Son of Mithridates III., reigned 266–240 B.C.

Arion (*c.* 625 B.C.), Gk. lute-player and poet, a native of Lesbos. He gave the dithyramb its artistic form. Herodotus tells us that returning to Corinth by sea with much treasure the sailors plotted his death. He pleaded permission to play his lute, and then, throwing himself into the sea, escaped on the back of a dolphin whom the melody had attracted.

Arioso, in music, characterised by melody as contradistinguished from harmony.

Ariosti, Attilio (*c.* 1660–1740), It. nusician and composer, *b.* at Bologna. He produced operas at Venice and Berlin, and finally in London. Of ome fifteen works, perhaps the best nown are *Coriolano*, *Dafne*, and *Erifile*.

Ariosto, Horace (1555–93), nephew the celebrated Ludovico and canon the cathedral of Ferrara. He was friend and admirer of Tasso, for hose *Jerusalem Delivered* he wrote me introductory stanzas.

Ariosto, Ludovico (1474–1533), de- ibed by Hallam as having been, ter Homer, the favourite poet of rope,' was *b.* at Reggio. For some rs he studied law in compliance h his father's will, but his bent n the first was towards literature. father died early, and he then oted much time to the care of his nger brothers and sisters. He already written two comedies and good lyrics when, in 1503, he taken into the household of the inal Ippolito d'Este. His life busy, for he was perpetually en- l in embassies to Rome and in matic business. Yet he man- in the intervals of business to lete his great work, the *Orlando Furioso*, of which the first ed. in forty cantos was pub. at Ferrara in 1516. In 1517 he quarrelled with the cardinal, and entered the service of the Duke of Ferrara, Ippolito's brother. His situation was not greatly improved, and in 1521 he was appointed governor of the Garfagnana, where his



LUDOVICO ARIOSTO

energies were chiefly devoted to the suppression of bandits and the enforcement of order. He was recalled some years later, and in 1532 appeared the finally revised *Orlando*, in forty-six cantos. Next year he *d.* at Ferrara, where he was buried in the church of San Benedetto. Besides his great work, he wrote five plays, seven satires after Horace, some Lat. poems, and a prose dialogue *Erbolate*, on the subject of hygiene.

The subject of the *Orlando* had already been treated by Pulci in his *Morgante Maggiore*, and by Boiardo in his *Orlando Innamorato*, and of this latter work the *Orlando Furioso* is professedly a continuation. It is the triumph of the half-satiric, fantastic, yet lovely style which Boiardo had hardly attained. The best-known Eng. translations are those of Sir John Harrington, 1591; Hoole, 1783; and Stewart Rose, 1823.

Ariovistus (first century B.C.), chief of the Ger. tribe of the Suevi. The Sequani, a Gallic tribe, being engaged in a conflict with the Ædui, asked his help. He defeated the Ædui, but settled in the land of the Suevi. The

two Gallic tribes now demanded assistance from Rome. In 58 B.C. Cæsar entirely defeated the Gers. at Vesontium (now Besançon).

Arish, or El Arish, is a small tn. on a slight eminence about half a mile from the Mediterranean shore, on the road from Egypt to Syria. It contains Rom. remains and sev. marble columns, and is the site of the anct. Rhinocolura. It was taken by the Fr. 1779, in whose possession it remained for some time. At A. Sir Sydney Smith concluded a convention with the Fr. army, which was afterwards disavowed by the British gov.

Arista, Mariano (1802–85), Mexican general and statesman. In 1846 he was defeated by General Taylor and the army of the United States at Palo Alto. In 1848 he became minister of war, and in 1851 president of the Mexican republic, only to be banished two years later.

Aristænetus, a Gk. writer of Nicæa who lost his life in the earthquake at Nicomedia A.D. 358. To him are attributed certain erotic or love-letters, and this is the A. to whom Libanius addressed sev. letters. His letters are really rhetorical treatises, of which there is a Ger. trans. by Herel, Altenburg, 1778, and sev. Fr. translations.

Aristæus, a Gk. divinity whose cult is found in ancient Thessaly, Bœotia, Arcadia, Thrace, etc. According to the general tradition, he was the son of Apollo and the nymph Cyrene, and was educated by Chiron, the centaur. At Thebes he married the daughter of Cadmus (Autonoë) and became the father of Actæon. He was worshipped as the protector of herdsmen and teacher of bee-keeping and the rearing of the olive tree.

Aristagoras (*d.* 497 B.C.), tyrant of Miletus, acted as regent for his brother, Histiæus, while the latter was at the Persian court. An attack on Naxos having failed, he raised all Ionia in revolt against Persia, and having obtained aid from Athens, attacked and burnt Sardis. His troops were, however, driven to the coast by the Persians, and he retired to die in Thrace.

Aristarchus of Samos (*c.* 250 B.C.), a Gk. astronomer, all of whose works are lost except a short treatise *On the Magnitudes and Distances of the Sun and Moon*. He is said to have taught that the earth moves round the sun.

Aristarchus of Samothrace (*c.* 220–144 B.C.), Gk. grammarian and critic. He early settled at Alexandria, where he studied under Aristophanes of Byzantium, whom he later succeeded as keeper of the Alexandria Library. Meanwhile, he was made tutor to the children of Ptolemy Philometor. It is said that in his old age he was persecuted by his former pupil, then ruling Egypt as Ptolemy Physcon, so that he retired to Cyprus and *d.* there at the age of seventy-two, his death being hastened by voluntary starvation invited by an incurable dropsy. He established a school of philologists who long flourished at Alexandria and Rome under the name of 'Aristarcheans.' He himself was wholly engaged in criticism and exegesis, being said to have written over 800 commentaries. He gave his attention chiefly to the poets, and above all to the Homeric poems. His edition of these latter is the foundation of the present recension. He gave much labour to the purification of the text, removing all interpolations and spurious readings. We are enabled to judge of his comments by fragments which have been preserved in the Venetian scholia to the *Iliad*. See Lehr's *De Aristarchi Studiis Homericis*, 3rd ed. 1882, and Ludwig's *Aristarchs Homerische Textkritik*, 1885.

Aristeas was sent by Ptolemy Philadelphus, King of Egypt, to the high-priest Eleazar to obtain people to translate the O.T. into Gk. A. gathered together seventy-two Jewish translators, who assembled on an is. to carry out the task, which, when finished, was called the Septuagint, *i.e.* The Version of the Seventy. This story is related in the Epistle of A., of which there is much uncertainty as to the date. According to some it goes back to *c.* 200 B.C., but it is probable that it is of a later period.

Aristias (*c.* 1798–1884) was a Gk. poet who lived in Wallachia. He is celebrated for his translation of the *Iliad* into Rumanian verse, and he took an active part in the political movements for the independence of Greece.

Aristides (*c.* 530–468 B.C.), surnamed the Just, an Athenian statesman. He was the son of Lysimachus, and came of an aristocratic family. He was one of the ten leaders at Marathon (490 B.C.), and persuaded his fellow-leaders to alter the arrangement that each should lead for one day, and to give Miltiades full power. In the next year he was made chief archon, and his zeal for the Conservative policy brought him into conflict with Themistocles, the democrat, by whose influence A. was ostracised *c.* 484 B.C. In 480 came the invasion of Xerxes, King of Persia, and Themistocles, eager to stop all dissension, secured the passing of a decree recalling all post-Marathonian exiles. A. profited by this, and did good service at Salamis. In 479 he was elected strategus, and shared with the

Spartan Pausanias the glory of the victory at Platæa. He later took the lead in the formation of the Delian league. He died poor, and his family were compelled to receive pensions from the state.

Aristides, Aelius, surnamed Theodorus, Gk. sophist and rhetorician. He was the son of Eudæmon, and studied under Polemon of Smyrna and Herodes Atticus. After many travels, he settled at Smyrna. Prior to this he had been troubled by illness for thirteen years, but this did not hinder him from the pursuit of his studies. In 178, when Smyrna had been destroyed by an earthquake, he secured from the Emperor Marcus Aurelius its rebuilding at the imperial expense. Fifty-five of his speeches are extant, as also certain other work. His six *Sacred Speeches* are worthy of note. Prin. ed. Dindorf, 3 vols. 1829.

Aristides, Quintilianus, a Gk. grammarian who lived probably in the third century A.D. He is the author of a treatise on music, one of the most important of antiquity. It was first edited by Meibomius.

Aristides of Thebes was a painter nd contemporary of Apelles. According to Pliny, he was the first to y to give expression to his characrs. His best-known picture is that a child approaching its mother, ho lies wounded and dying in the dst of a sacked city.

Aristippus (*c.* 435 till after 466 B.C.), nder of the Cyrenaic or Hedonist ool, was *b.* at Cyrene. He was a il of Socrates, whose philosophy artially adopted, making pleasure final aim of life. He lived, therethe life of a philosophic volup-, while retaining restraint over assions at the same time. He d much of his life at Syracuse at court of Dionysius, and lived time at Corinth in intimacy with famous courtesan, Lais. His nes were taught after his death daughter Arete, and later by n, Aristippus the Younger.

tobulus of Cassandria (fourth y B.C.), a Gk. historian who panied Alexander the Great on npaigns, and later wrote an of them. Arrian made cone use of his works.

bus, an Alexandrian Jew, of the second century B.C., ne philosophers of the Jewish f Alexandria. A few frag- his work are preserved in of Alexandria and Eusebius. to prove by quotations oborged that the Gk. philoorrowed their system from euch. *See* Schürer, *History ish People*, vol. ii.

acy, theoretically a form of government administered by the best citizens (Gk. ἄριστος, best). In practice it means government by the nobility. *See* GOVERNMENT.

Aristodemus (eighth century B.C.), King of Messena, who waged a twenty years' war for independence against the Spartans. He committed suicide in despair of final success, on the receipt of unfavourable oracles.

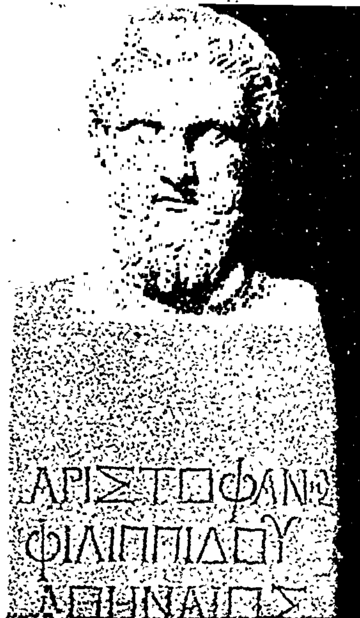
Aristogiton, a noble Athenian who lived in the beginning of the sixth century B.C. He together with Harmodius plotted the death of the tyrant Hippias and his brother Hipparchus. Hipparchus was murdered at the Panathenic festival, 514 B.C. Harmodius was immediately killed. A. escaped but was afterwards taken and put to death by Hippias. Four years afterwards Hippias was expelled, and Harmodius and A. were regarded as martyrs, bronze statues being erected to them in Athens. According to Thucydides and Herodotus (vi. 123), the plot arose out of a private quarrel, and was not undertaken in the cause of liberty.

Aristolochiæ is the name of a large genus of herbs or woody vines, the birth-worts, as they are popularly called. They are characterised by pungent aromatic rootstocks and irregular flowers. They are cultivated chiefly for the flowers, these being curiously shaped, with peculiar markings. The European birth-worts and related species were once famous for their reputed medicinal properties.

Aristomenes (seventh century B.C.), a Messenian general who led his countrymen in the second Messenian war. After a number of daring attempts and brilliant successes he was betrayed by Aristocrates of Arcadia, and fled to Rhodes, where he died.

Aristophanes (*c.* 450 – *c.* 385 B.C.), the most renowned of the Gk. comic dramatists, probably *b.* at Athens, where he spent his life. His education was of the best, and he favoured throughout the aristocratic and Conservative party. His production began early, and altogether fifty-four comedies are ascribed to him, of which eleven only are extant. These comedies fall into three well-defined periods, the first extending from 427 to 421 B.C., the second to 405, the last to 388. His early plays show unrestrained political satire, the second period shows more restraint, and in the plays of the third period the satire is chiefly social. His extant plays of the first period are five. *The Acharnians* (425) seeks to aid the peace party by drawing the contrast between Lamachus the warlike and Dicæopolis, an honest countryman, who makes peace with Sparta on his

own account, and on whom all blessings are showered. *The Knights* (424) is a vigorous attack on Cleon, who for a while beguiles the populace represented under the name of Demos. Demos is finally rescued and his youth restored. *The Clouds* (423) satirises the Sophists and especially Socrates, the proprietor of a 'thinking shop' where all dishonesty is



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taught. Alcibiades is represented under the name of Phidippides, the young Athenian. In *The Wasps* (422), A. ridicules the Athenian love of law-suits, and in *The Peace* (421) he continues the theme of the Acharnians, advocating once again a truce with Sparta. To the second period belong four plays. In *The Birds* (414) two old Athenians leave the town and persuade the birds to build in mid-air the city of Cloud-Cuckoo-town. The gods are thus cut off from the sacrifice of men, and the sceptre is regained from Zeus. Some have seen in this play an allegory of the Sicilian expedition. *The Lysistrata* (411) shows the women taking the affair into their own hands and making peace. *The Thesmophoriazusæ* (411) contains an attack on the tragic poet Euripides. *The Frogs* (405) continues this literary satire. Dionysus is sent to Hades to fetch a poet, Æschylus and Euripides having just died. These two contend for the throne of tragedy, which is finally won by Æschylus. In *The Ecclesiazusæ* (392 or 389 B.C.) the dramatist ridicules the mania for communism, while *Plutus* (388) is merely a moral allegory. The works of A. are characterised by wit and hearty humour, by a perfect agreement of matter and form, and by exquisite lyric quality.

Principal editions by Meineke (1860), Dindorf (1869), Blaydes (1886). Translations of various plays by J. H. Frere, T. Mitchell, H. Kennedy, B. Rogers, etc. (Everyman, No. 344).

Aristophanes of Byzantium (*c.* 260–*c.* 185), a famous Gk. grammarian, the pupil of Lenodotus. He pub. valuable critical editions of the Homeric poems, of Hesiod, and of the other chief Gk. poets. He also did valuable work as a lexicographer, and introduced critical signs, punctuation, etc. *See* Nanck's *Aristophanis Byzantii Fragmenta*, 1848.

Aristotelia is 'those things pertaining to Aristotle.' *See* ARISTOTLE.

Aristotle (384–322 B.C.), the Gk. philosopher, was *b.* at Stagira (hence the term 'the Stagirite' for the philosopher), a Gk. colony on the peninsula of Chalcide, in the year 384 B.C. He came of a family which had long been given to the study of medicine, his father, Nicomachus, being the physician and friend of Amyntas, King of Macedonia. Though he never took up medicine as a profession, it seems probable that A.'s education included this study to a large extent. It is said that he practised medicine when he first came to Athens, and his later inclinations towards natural science may also be traced to his early training.

In his eighteenth year (367 B.C.), he came to Athens with the intention of studying philosophy under Plato. This great philosopher was, however, then absent in Syracuse, on the mission which so strangely connects him as adviser with Dionysius the Elder and Dionysius the Younger. A., therefore, occupied himself with his own studies until the return of Plato in 364 B.C., when he became his pupil, and continued as such for twenty years. The master soon became aware of the penetration and range of his pupil's intellect, and we are told that he described him as 'the intellect of the school.' At this time, too, it is said that A. taught rhetoric in opposition to Isocrates, who was doubtless a representative example of the teachers of superficial eloquence then popular. In 347 Plato died, having appointed his nephew Speusippus master of the school. This fact induced A., who might well have expected that his own pre-eminence would have gained him this position, to leave Athens.

On the invitation of Hermias, despot of Atarneus, he retired with a fellow-pupil, Xenocrates, to the court of Atarneus. Hermias was himself an Academic, and his two friends lived quietly with him for three years until his death at the hands of a treacherous enemy. A. then retired to Mitylene, taking with him Pythias, the niece of Hermias, whom he afterwards married, and by whom he had his daughter Pythias. He had in later life one son, Nicomachus, born to him by his concubine, Herpyllis. This son has, for some unknown reason, given his name to the chief of A.'s ethical writings—the *Nicomachean Ethics*.

In the year 342 A. was summoned to Macedon by Philip to instruct his son, Alexander, then in his fourteenth year. For three years he was engaged in this task, after which he retired for a while to Stagira, which he induced the king to rebuild. Not until Alexander had ascended the throne did the philosopher finally leave Macedonia. So, in 335 B.C., he returned to Athens and the last great period of his life began. He opened a school at the Lyceum, a gymnasium which received its name from its propinquity to the temple of Apollo Lyceius. The members of the school came to be called Peripatetics, from his habit of walking up and down while discoursing, or, possibly, from their meetiug at a place called 'The Walk.' The followers of Xeno-crates, who had now succeeded Speu-sippus as head of the Academy, were known as Academics. This life went on for twelve years, when, in 323, Alexander died. The anti-Macedonian arty at Athens began to gain the scendency, and the philosopher was ccused of impiety on the grounds at he deified the tyrant Hermias. ne charge was absurd, but A., indful of the fate of Socrates, ought it prudent to retire to Chalcis Eubœa, where, in the autumn of 2, he *d.*

is writings have unfortunately ne down to us in a very confused n. It is certain that many of so attributed to him are not his, the condition of the genuine s is far from satisfactory. The uage of most of them is abrupt, conversational promises are made hen forgotten; there are sudden s in the thread of the argument; imes they are redundant, some-inconsistent. In a word, it is nt that these writings, which so profoundly affected the t of all succeeding ages, were completed nor arranged by iter himself. It has, indeed, ggested that they are nothing more than the notes taken dow by his scholars from dictation, an afterwards edited by them. Th hypothesis is refuted both by th extreme compression of parts of th works and by the fact that A. gene rally lectured while walking, and a far more probable explanation is that the works as we have them are, in the main, the unfinished notes and discourses of A. himself. Much of their disconnectedness may be attributed to the length of time over which their composition was probably spread, and to the development of his theories during this time. Strabo, the geographer, relates that on the death of A. his library, after passing through many hands, came into the possession of Andronicus of Rhodes, and became the basis of his edition of the *Works* prepared *c.* 70 B.C.

The extant writings may be divided on the basis of the mediæval classifications under the heads of Logic, Natural Science or Physics, First Philosophy or Metaphysics, Ethics and Politics, Literature. The works on logic, grouped together by his editors as the *Organon*, comprise *Categoriæ*, on the ten classes of predicates; *De Interpretatione*, on language, dealing with the proposition and its parts; *Analytica Priora*, in two books, dealing with the syllogism; *Analytica Posteriora*, in two books, dealing with the method of scientific demonstration; *Topica*, on dialectical syllogism and reasoning from probabilities; *Sophistici Elenchi*, on the fallacies which the sophists made use of in refutation and their solution. The treatises on natural science include four important works on physics: *Physica Auscultatio*, treating of the general principles of natural science; *De Caelo*, a treatise on astronomy; *De Generatione et Corruptione*, on generation and corruption in general; *Meteorologica*, discussing sub-lunary phenomena.

A second div., chiefly biological, would include *Historia Animalium*; *De Partibus Animalium*, on the causes of the facts about animals; *De Generatione Animalium*; *De Anima*, on the soul as connected with the body; *Parva Naturalia*, comprising eight works on sense, memory, dreams, etc. A.'s one work on the subject which he called First Philosophy is the *Metaphysica*, so called on account of its having been placed in the first edition of his works 'after' the treatises on Physics. The work gives a sketch of previous philosophical systems, and then deals with the causes, principles, and properties of Being, and treats of God as the prime Mover of the world. The

ical and political works include *hica Nicomachea; Ethica Eudemia; agna Moralia*, all concerning the od of the individual; *Politica*, on e good of the state; *Œconomica*, on o good of the family. This last is robably the work of a later school. n the domain of literature, though he philosopher had intended ulti- ately to deal with all forms of art, nly two works are comprised, but one of these, *De Poetica*, has, mainly through the misunderstandings of mediæval commentators, affected the history of all European literature. The other, the *Ars Rhetorica*, is less important.

Aristotle's philosophy. Though A. never allows us to forget the great degree in which he differed from his master Plato, yet it is important to remember that he can always speak of the Platonic tenets as those which *we* hold. In fact, A. was probably much more in sympathy with Plato than were his immediate successors at the Academy. Yet their difference as to the attitude of inquiry was fundamental, and may thus be briefly put: Plato takes his departure from the eternal, from the universal form; A. from the actual world of nature, from the individual substance. Plato was a poet and an idealist; A., though possessing a great range of interest, is fundamentally a man of science. Their points of agreement and difference are well shown in the *Metaphysica*, where we see that whereas Plato finds reality only in the universal 'idea,' A. seeks it in the individual things, which he defines as a combination of the universal-form and matter. Yet both agree that the reality or essence of the thing lies in the idea. But a more important divergence is in A.'s criticism of the Platonic 'ideas' as being only potential and not actual causes of the phenomena of the world. Hence is elaborated the famous doctrine of the four causes which combine to produce any individual object, and which give four lines of inquiry when investigating it. These are: (1) the material cause, or the material conditions of its existence; (2) the essential cause, giving its essential character and realisation; (3) the actual cause, through the agency of which it comes into being; (4) the final cause, giving the end or result attained by it. But the work deals also with theology, and A. expressly speaks of the prime and unmoved movement of the earthly and heavenly bodies as God. His language on the subject is simple, and perfectly clear. God is the excellence, more excellent ... can attain to. He is perfect, with eternal and continuous life. The philosopher then explains the anthropomorphic mythology of the time as accretions which have been added for the use of the vulgar to the original conception of a single divinity investing the whole of nature. There are many omissions in the scheme of the first philosophy, and difficulties are multiplied by the fact that A. had to invent many of his technical terms and that he did not always use them in the same sense. The invention of logic was, perhaps, the prin. work of A. He regarded it as no true part of philosophy, but as its handmaid or instrument, and hence the name *Organon* given to the group of treatises on the subject. Even this name was given it by the later Peripatetics. The founder of logic himself gave it no name, neither subdividing the subject nor combining it into a system. It is noteworthy, too, that in his classification of the sciences he gave no place to this one of his own evolution.

A.'s scientific treatises have long since fulfilled their service. His researches show insight, observation, and knowledge; but their intrinsic value was never great, and in later ages they showed signs of becoming a positive hindrance to progress through the reverence felt for his great name.

The metaphysical and physical philosophy, together with the logical treatises, were grouped together by the author as speculative science; while practical philosophy comprised the Ethics, Politics, and treatises on Art. The Politics are the application to the state of the principles which had been applied to the individual in the Ethics. Briefly, they consist of the old question: 'What is man's greatest good, and how can it be realised?' There are various degrees of goodness, of which the chief are theoretical wisdom, which is the highest, practical goodness, and goodness of character. The first of thes is the contemplation and comprehen sion of the loftiest principle of th universe. Practical goodness con sists in the carrying out of the mor virtues. Goodness of character is th habit of mind which enables a man choose the mean between extremes extravagance. These last two for of goodness should not be neglec by the philosopher, but should developed at the same time as highest. Since, however, reason obviously the highest faculty of soul, being, in fact, the one th which differentiates man from other organic bodies and app mates him to God, it should re the supreme place. In the Po

the subjects dealt with are the good of the individual citizen, which should consist in the happiness of virtuous action, and the good of the state. Right govs., then, are those which aim at the general good, and they may be either: (1) *Monarchies*, the rule of one man excelling in virtue; (2) *Aristocracies*, the rule of a class excelling in virtue; or (3) *Commonwealths*, the rule of the many who excel in virtue. On the other hand, the wrong govs. are perversions of these three forms. A wrong gov. may be: (1) a *Democracy*, aiming merely at the good of the majority; (2) an *Oligarchy*, aiming at the good of the few; or (3) a *Tyranny*, aiming at the good of one man. All these last are distinguished by the fact that their aim is the benefit of the ruling body rather than that of the whole community. Last to be considered are the two works in which the art of production is dealt with, the *Rhetorics* and the *Poetics*. The first is a treatise on the art of persuasion, and its influence has been almost nil. In the Poetics, A. shows himself a literary critic of the first order. After a subdivision of the kinds of poetry, he deals at length with tragedy, which, he says, 'by raising pity and fear, purges the mind of these passions.' Perhaps no literary judgment has given rise to more controversy as to its meaning, controversy which is not yet ended. From the commentators on this work, and not from the work itself, is gathered the famous theory of the three unities which was so long attributed to A. himself. Misunderstanding though it was, it has influenced the whole course of European drama. Not until the Middle Ages did the period of A.'s greatness begin, and then he was known only in Arabian translations. From the translations of Avicenna and Averrhoes his philosophy was taken up by the schoolmen, and made the framework in which to arrange the theology of the Christian church. His writings were generally received as the summary of sciences, and as such they were taken up and reconciled to the Catholic dogmas, which his philosophy was used to express, by the reat St. Thomas of Aquinas. With he Renaissance came a natural rection, but even here, the philosopher mself recovered rather than lost estige. His works were studied the original, and many of the rors of his commentators removed. *Literature.*—the standard edition the complete works is still that of kker (5 vols., Berlin, 1831–70). itions worthy of note containing ticular works are Pacius's *Organon* (Frankfort, 1592), Waitz's *Org* (Leipsig, 1844–6), Aubert and W mer's *Historia Animalium* (Lei 1868), Bonitz's *Metaphysics* (B 1848), Hicks's *De Anima* (Cambri 1907), Bywater's *Ethica Nicoma* (Oxford, 1890), and *Poetica* (Lon 1898), Cope's *Rhetorica* (Cambri 1877), and Butcher's *Poetica* (Lond 1898).

Aristotle's Lantern, a jaw-appa tus in the sea-urchin, consisting five hard pointed teeth in socke formed by five ossicles. The tee protrude through the mouth-mem brane and are actuated by muscl that enable them to be drawn t gether or apart, inwards or outwards The animal is thus enabled to scrap algæ and seaweeds from the rocks t feed itself.

Aristoxenus (fourth century B.C.), a Gk. philosopher, pupil of Aristotle. He wrote, amongst other works, a treatise on music, rejecting the mathematic system of Pythagoras.

Arita, a tn. of Japan, on the is. of Kiushiu. It is famous for the manuf. and export of porcelain. Pop. about 6000.

Arithmetic, that branch of mathematics which treats of numbers. The study of A. is included in every scheme of education, mainly on account of its bearing on the practical side of everyday life. Measurement and the calculation of money values are dependent on some theory of number, and it is difficult to realise what we owe to the system of numeration by local value which we have adopted from the Hindus. The Gks. and Roms. used clumsy symbols, and some idea may be formed of the difficulty of calculating in such symbols by attempting, say, to multiply CLIX by MDIV without using the decimal notation. The Hindu, or, as it is commonly called, the Arabic system was introduced into Europe in the eleventh century, the double rule of three, or compound proportion was introduced in the sixteenth, and in the next century Napier of Merchiston invented his system of logarithms, since when there has been little advance in the rules of A. proper.

A. as usually taught in schools consists of the consideration of the four elementary operations: addition, subtraction, multiplication, and division; the application of those rules to measures of length, weight, money, etc.; the splitting up of numbers into factors, leading to the determination of least common multiple and greatest common measure; the system of fractions, vulgar and decimal, and its application to the determination of values by what is called practice; and the rule of three, or proportion. An

attempt is usually made to introduce ideas relating to commercial life by calculations on imaginary transactions involving percentages, interest, simple and compound, stock investments, bill discounting, etc., but sometimes this is relegated to what is called commercial A.

The value of A. as a school subject is threefold: it serves to equip the pupil for carrying on business involving quantities and values, it has a disciplinary or purely educational effect on the mind, as its processes illustrate the methods of reasoning, and it serves as an introductory step to the study of mathematics generally, which in its turn has its educational and purely utilitarian values. The disciplinary value depends mainly upon the methods of teaching, but the practical utility of A. depends upon the ease, accuracy, and rapidity with which the simpler relations of addition and multiplication can be recollected. It is customary, and necessary, for the addition of all pairs of numbers up to ten, and the multiplication of all pairs of numbers up to ten or twelve, to be learned 'by heart.' That is, there should be no necessity to call up any mental image of the quantities involved in the addition or multiplication; seven times nine, for instance, should suggest sixty-three with certainty at once.

Text-books are numerous, and the number increases yearly, but the following may be referred to as being of general interest: Sir Oliver Lodge, *Easy Mathematics, chiefly Arithmetic*, 1905; L. Seeley, *The Grube Method of Teaching Arithmetic*, 1890; D. E. Smith, *The Teaching of Elementary Mathematics*, 1900.

Arithmetical Complement of a number is the difference between that number and the next highest power of 10, *e.g.* the A. C. of 6 is $10-6=4$; of 49 is $100-49=51$; and of 7642 is $10,000-7642=2358$.

Arithmetical Mean is a quantity which has an intermediate value between two other quantities; thus the A. M. between 9 and 17 is 13, *i.e.* half of the sum of 9 and 17.

Arithmetical Progression is a series of numbers which increase or decrease by a common difference, such as 2, 4, 6, 8, 10, 12, or 25, 20, 15, 10, 5. If 'a' denote the first term, 'l' the last term, 'd' the common difference, and 'n' the number of terms, then $l = a + d(n-1)$ and the sum of all the terms $= \frac{(a+l)n}{2}$.

Arithmetical Proportion, *see* ARITHMETIC and PROPORTION.

Arius (*c.* 256–336), founder of the Arian heresy, was *b.* in *Libya*, and became one of the chief figures of the first great controversy in the church. He went to Alexandria, and was there ordained deacon. In the Meletian schism he sided with Meletius and suffered excommunication. He later repented and was received back into the church by Achillas, Bishop of Alexandria, who then ordained him presbyter, and gave him the charge of one of the city churches. So great was the repute of A., that on the death of Achillas he expected to receive the see, but Alexander was chosen. When quite an old man, about the year 321, A. first broached his heresy, which in a less developed form had long been current at Antioch, where he had received his education. He denied that the Son was co-eternal with the Father, though affirming that He was begotten before time, and that by Him the Father created all things. A.'s aim was to prevent the idea of there being two Gods, and to solve this he described the Son as a created Being, though far surpassing all others. Alexander excommunicated his presbyter, who refused to give way, and sought help throughout N. Africa. Alexander also sent a circular letter to the bishops informing them of the course of events. Many favoured A., and the chief of his supporters was Eusebius, Bishop of Nicomedia, who had been his fellow-student at Antioch. A. was a fine propagandist, and in his *Thalia* he explained his doctrines in verse set to music which was soon sung throughout the land. The controversy soon reached Rome, and Constantine, failing to realise the importance of the dogma in debate, made efforts for a compromise. This failing, he called the first œcumenical council at Nicæa in 325. Athanasius, Deacon of Alexandria, was the chief exponent of the orthodox view. The orthodox insisted that the Son was 'of the same substance' (ὁμοούσιος) with the Father, and round this word the battle raged. A. was condemned, and, with two bishops who supported him, banished to Illyria, while the orthodox creed was promulgated. The continued support of Eusebius of Nicomedia secured the recall of A. in 320, and he secured the ear of the emperor. Constantine, finding it impossible to compel Athanasius, now Bishop of Alexandria, to reinstate the heretic, banished the prelate to Gaul in 335. At last, in 336, Alexander, Bishop of Constantinople, was persuaded to consent reluctantly to admit A. to communion, but before this was done the latter was taken suddenly ill, and within a few hours was dead. After his death, Arianism became practically extinct in the

empire before the end of the fourth century. For a couple of centuries longer it lingered among the Goths and other Teutonic tribes who had received Christianity from Arian missionaries, chief of whom was Ulfilas.

Arizona (Ind. Sp. meaning 'few springs' or the 'dry belt'), a state of the Union, N. America, situated between Utah on the N., New Mexico on the E., Mexico on the S., and California and Nevada on the W. It ranks fifth among the U.S., with a gross area of 113,956 sq. m., 100 sq. m. of this being water. The state is divided diagonally into two parts by the Mexican Cordilleras. The N. region consists of a plateau, broken by high mountains, which in the San Francisco Range attain a height of over 12,700 ft. In the S. and S.W. are wide, desert plains watered by the Salt and Gila Rs. The Colorado and its tributary, the Little Colorado, water the N.W. region. The annual precipitation ranges from 1 to 10 in. in the W. and from 10 to 25 in. in the E. Few crops are grown without irrigation in the lowlands, the climate being dry and clear, suitable for astronomical observations, and the soil unproductive. Several large reservoirs have been constructed, the most notable being the Roosevelt dam. The Yuma project for tapping the lower Colorado has recently been completed. Projects have also been made for supplying water for electrical power to the State copper mines. The most important crop is cotton, but wheat, barley, corn, etc., and semi-tropical fruit are also cultivated. Farming is carried on to a great extent; in 1925 there were 10,802 farms. Cattle and sheep are reared on the pasture lands, and the forests (13,668,366 acres) provide good timber. The state is rich in mineral deposits, the greatest output being in copper, gold, silver, and lead, while granite, limestone, asbestos, and quicksilver are also worked in the state. The development of A.'s agric. resources by irrigation has scarcely begun, but enough has been accomplished to show that it is not the barren desert it is commonly supposed to be. Cattle-rearing is favoured by the climate, and there s much timber. Mining is a source f great wealth. There have been erious strikes in some of the mining ns. The chief industry is the smeltg and refining of copper, the value its products amounting to over 80 r cent. of the total value of procts and yielding production valued about 105 million dollars annually. State university was founded at cson in 1885 and now has some 2500 students. There is also Tucson a State agricultural scho There are some 45 public high schoo and two public normal schoo School attendance for children compulsory up to 16 years, an instruction free up to the age of 2 years. Enormous subterranean caves rivalling the mammoth cave of Kentucky, were discovered i 1909. The country was discovered by Marcos de Niza, a Spaniard, in 1539, rumours of its wealth having reached Spain through the explorer, de Vaca. In the following year Vasquez de Coronado explored the country, but the earliest settlements were made by Spanish missionaries at Tucson and Tubac about 1772. A. remained under the influence of Spain till 1821, when it achieved its independence. In 1848 it was ceded to the U.S.A., and was organised as a territory in 1863, becoming a state of the Union on Feb. 14, 1912. In the laws which were enacted by A.'s first State Legislature, the affairs of State govt. are put under direct popular control, so that at any time the machinery of the Initiative Referendum and Recall can be put into motion. By an amendment in 1912, the people gave the State power to engage in industry. The State Senate has 19 members and the H. of Representatives 46. In Congress, A. is represented by one member of the lower House and two senators. In 1930 the pop. was estimated at 407,702. There are still 32,000 Indians. Pop. of Phœnix, 47,950; Tucson, 32,198; Bisbee, 9205; Globe, 7044, and Douglas, 9916.

Ark of Noah, *see* DELUGE.

Ark of the Covenant, was the name of the sacred chest of shittim (acacia) wood borne by the Israelites in the journey in the desert. It contained the two tables of the law (Deut. x. 2). It figured at the taking of Jericho, where it was borne, as was the rule, by the Levites. It was captured by the Philistines and set up in the temple of Ashdod. Finally it found its resting-place in the temple of Solomon.

Arkansas, was given the name of wonder state by an Act of the general assembly in 1923. A S.-Central state of the U.S.A., bounded on the N. by Missouri, E. by the R. Mississippi, S. by Louisiana and Texas, and W. by Texas and Oklahoma. The surface of the state is very varied. It may be divided about equally into the N.W. highland division and the S.E. lowland division. Out of the broad alluvial bottoms of low elevation which border the Mississippi R. and its chief W. tributaries rise the Coastal Plains, which extend N.W.

to the Boston Mts. belonging to the Ozark Uplift. The Mississippi forms the E. border, while its chief tributary, the Arkansas, bisects the state from W. to E. Other important rivs. are the St. Francis and White Rs. to the N., and the Saline, Ouachita, and Red Rs. to the S. The climate is pleasant and healthy, except in the malarial swampy district of the E. The normal rainfall is from 45 to 55 in., but even this is not sufficient for the rice-fields, which have to be flooded through artificial means. The chief product is cotton. Irrigation has made rice-growing an important industry, much fruit is grown, and maize and oats. It is the only state in which diamonds have been found. 1,450,000 tons of coal were raised in 1921 and 71,791,000 barrels of petroleum in 1925. Lumber and timber products hold the first place in industry. There are 44,645 wage-earners in factories. The growth of manufactures has been considerable, the most important branch being the lumber and timber industry, which includes logging operations, planing mills, sawmills, etc. There are good railroads, except in the mountainous districts of the N. and W., the chief being those which connect the cities of the N.-central states with the Gulf cities on the S. There are natural hot springs, world-famed as a cure for rheumatism and kindred ills, and the town of Hot Springs has sprung up beside them. A. was visited by the Spaniard, De Soto, in 1541, but the first settlement was made by Frenchmen at Arkansas Post in 1686. The Mississippi was explored further by Marquette and Joliet (1673) and La Salle (1682), and the territory, after passing through Fr. and Sp. hands, was purchased by the U.S.A. in 1803. A. was erected into a territory in 1819 and admitted as a state into the Union in 1836. It ranks 25th in population, and 26th in land area among the states. Area 53,335 sq. m. One third of the population is negro. The railways are required to provide separate cars for them. Pop. 1,854,482. The chief cities are Little Rock, the capital, 81,679, Fort Smith, 31,429, Pine Bluff, 20,760, North Little Rock, 19,418, Hot Springs, 20,238, El Dorado, 16,421, Texarkana, 10,764.

Arkansas City, city of Cowley co., Kansas, U.S.A., on the Arkansas and Walnut rivs. Manufs. flour and [illegible]. Pop. [illegible].

Arkansas River is, next to the Missouri, the largest trib. of the Mississippi. It rises in the mts. of central Colorado, and flows eastward until about 95° W. long. It the[n] flows S.E. until it reaches the Missis[s]ippi. Total length about 2000 m.

Arkeeko, a seaport on the W. coas[t] of the Red Sea, 3 m. S. of Massowah.

Arklow, a small seaport of Ireland, co. Wicklow, some 50 m. S. of Dublin. There is much sea-fishing, and oyster beds are numerous. Near it are th[e] ruins of Shelton Abbey, the seat o[f] the Earl of Wicklow. The city wa[s] stormed and dismantled by Crom[-]well in 1649, and in 1798 it was th[e] scene of sanguinary conflict betwee[n] the rov. and the United Irishmen. The tn. stands at the mouth of the R. Avoca, the valley of which is justl[y] famous for its scenery; pop. 5042.

Arkona, the N.E. promontory o[f] the Ger. Is. of Rügen, in the Balti[c] Sea. On its summit is a lighthous[e] whose light is visible for 35 m., and o[n] the W. are the ruins of the temple o[f] the Wend deity, Swantewit.

Arkwright, Sir Richard (1732–92), famous inventor of cotton-spinnin[g] machinery, was *b.* at Preston in Lan[-]cashire, the youngest of thirtee[n] children. His parents were poor, an[d] he was early apprenticed to a barbe[r]. He estab. himself in this professio[n] at Bolton in 1750, where his profit[s] were increased by his invention of [a] special method of dyeing human hai[r]. He also gave himself to the study o[f] the cotton machinery, but, as he ha[d] little mechanical skill, he secured th[e] assistance of John Kay, a watch[-]maker of Warrington, in the carryin[g] out of his designs. About 1767 h[e] seems to have invented his celebrate[d] *spinning-frame*, of which the chie[f] value was its provision of the war[p] which Hargreaves's spinning-jenn[y] had been unable to supply. In 176[9] he took out a patent for this, an[d] erected his first mill at Nottingham. In 1771, with Jedediah Strutt an[d] Samuel Need as partners, he buil[t] larger factories at Cromford, in Derby[-]shire. In 1775 he took out a fres[h] patent for further improvements, bu[t] these patents were continuously in[-]fringed on all sides, and in 1781 h[e] took action in the courts. Publi[c] opinion, however, was inimical t[o] him, and the verdict was unsatis[-]factory. The working classes hate[d] him as a labour-saver, but his com[-]mon sense enabled him to amas[s a] fairly large fortune.

Arlaud, Jacques Antoine (1668–1743), a celebrated miniature painter, was *b.* and *d.* at Geneva. He wa[s] held in great reputation in Paris, an[d] came to England in 1721. In Lon[-]don he painted the miniatures of th[e] Pretender's sister and of the Duke o[f] Marlborough. He bequeathed man[y] books and curios to the library [of] Geneva.

Arlberg, a mt. of the Rhætian Alps, between the Tyrol and Vorarlberg, which two provs. are connected by the A. Pass, nearly 5900 ft. above the sea. A railway tunnel, constructed 1880–4, is now in use. Its highest point is 4300 ft.

Arlen, Michæl (real name: Dikrān Kuyumjian), novelist, an Armenian; *b.* at Rustchuk, Bulgaria, in 1895; naturalised British subject, 1922. In 1920 he had published *The London Venture*: and, two years later, his *Piracy* obtained notice in the 'Literature' section of the *Annual Register*, which attributed to him 'polished wit' and 'bright social scene.' Other books of his are: *These Charming People*, 1923; *The Green Hat*, 1924; *May Fair*, 1925; *Lily Christine*, 1928; *Young Men in Love*, 1929. The first two of these he has dramatised. In 1925 Barry Pain published *This Charming Green Hat-Fair*, which, while parodying, did not exaggerate, and indeed refined upon, A.'s effusively intimate style—a modernisation of that of *The Cricket on the Hearth*.

Arles, a tn. of S. France, dept. Bouches du Rhone, on the l. b. of the Rhone, 17 m. S.E. of Nismes, united with the Mediterranean harbour of Bouc by a canal. It is famous for its Rom. remains, which include baths, a palace of Constantine, an aqueduct, and an amphitheatre. Under the later Rom. emperors was one of the most flourishing of the Citralpine tns. It was a free city in the twelfth century. The old cathedral of St. Trophime, the finest Romanesque church in Province, stands in the centre of the tn.; its chief portal, dating from the twelfth century, is a masterpiece of graceful arrangement and rich carving. A. possesses flour-mills and oil and soap works, and sheep-breeding is a considerable industry in the vicinity. Pop. 31,014.

Arlincourt, Charles Victor Prévot (1789–1856), a Fr. author, was *b.* at the castle of Merantris, near Versailles, and *d.* at Paris. He held sev. gov. positions, but soon retired and gave his time to literature. Among his works are *La Caroléide*, a poem; *Le Siège de Paris*, a tragedy; and the following novels: *L'Etrangère*, *Le Renégat*, *Ipsiboé*, *Le Solitaire*, *Les Rebelles sous Charles V.*, *Bannissement*, *Le Retour de Charles VII.*, and *Le Double Règne*.

Arling, the old name for the bird wheatear.

Arlington, (1) A banking post tn. in ..., U.S.A. Pop. 36,094. (2) Lo... in Virginia. Near here is a national cemetery containing the remains of about 18,000 soldiers. Near the Virginian town, on the heights ... from Washington, is situated the most famous of American national cemeteries. The building and grounds were once the home of Robert E. Lee, the commander-in-chief of the Confederate armies during the Civil War. The grounds were taken over by the Federal Gov. Here lie buried over 33,000 soldiers, among whom are many of the famous Federal officers of the Civil War. The body of the unknown soldier lies here in a splendid monument. Just as every year on Nov. 11 the British royal family attends the services at the Cenotaph in London, so in the U.S.A. every year on the same date special services are held in Arlington attended by the President and Cabinet.

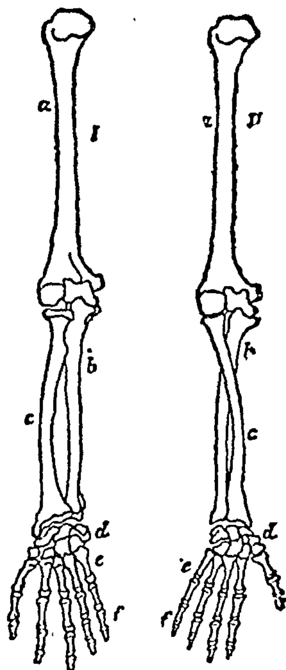
Arlington, Henry Bennet, Earl of (1618–85), was *b.* at Arlington, Middlesex, and educated at Westminster School and Christ Church, Oxford. He was wounded in the Civil War, and employed afterwards by Charles as his agent at Madrid. Returning to England at the Restoration, he was a member of the unscrupulous 'Cabal'; he was created Lord A. in 1663, and Earl of A. in 1672. He was impeached as a promoter of popery, a self-aggrandiser, and a betrayer of trust in 1674, and on the impeachment falling through he retired to his Suffolk seat, Euston.

Arliss, George, actor. *b.* London, England, April 16, 1868. Made his first stage appearance at the old Elephant and Castle Theatre, London, 1887. Made his first tour in the U.S.A. with Mrs. Pat Campbell, 1901. In New York created rôle of Zakkuri in *The Darling of the Gods*, 1902. Has since then devoted most of his acting time to theatres in America, where he is a universal favourite. In recent years has only played one season in England, where he repeated his American success in *The Green Goddess*, by William Archer. President of the Episcopal Actors' Guild of America. Author of plays, and of an autobiography *Up the Years from Bloomsbury*.

Arlon, a Belgian tn., is cap. of the prov. of Luxembourg. It is a thriving place, having a considerable trade in corn, ironware, tobacco, clay pipes, and crockery. It is mentioned as early as A.D. 870; pop. 11,160.

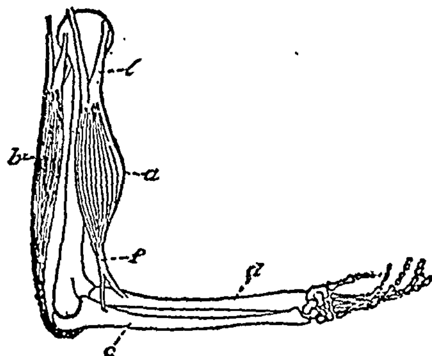
Arm, the fore or upper limb in man from the shoulder to the wrist. The *humerus*, or bone of the upper arm, has at its upper extremity a convex spheroidal surface which fits into the glenoid fossa of the scapula, or shoulder-blade. The lower extremity has a small head or *capitellum* for articulation with the *radius*, and a *trochlea* or pulley for guiding the movements of the *ulna*. The *ulna*

and *radius* are the bones of the fore-arm, and are articulated with each other and with the wrist-bones at the lower extremity.



THE BONES OF THE RIGHT ARM:
I. In Supination (palm upward); II. In Pronation (palm downward). *a*, humerus; *b*, ulna; *c*, radius; *d*, carpal bones; *e*, metacarpals; *f*, phalanges.

The *deltoid* is the large muscle forming the shoulder cap, and serves to raise the A. from the side; it runs from the shoulder-blade to the middle of the humerus. The chief muscles engaged in lowering the A. again



ARM, WITH FOREARM FLEXED. *a*. biceps; *b*, triceps; *c*, ulna; *d*, radius; *f*, tendons.

are the *latissimus dorsi*, attached to the front of the neck of the humerus. the *coraco-brachialis*, attached to the middle of the front of the humerus and the *pectoralis major*, which forms the front fold of the armpit. The A. is flexed by the *biceps*, running from shoulder to elbow-joint in front, and is straightened by the *triceps*, running from shoulder to elbow at the back of the A. The muscles of the forearm consist of the flexors and extensors of the wrist and fingers.

The chief arteries are the *axillary*, passing under the armpit, and becoming the *brachial* as it traverses the upper arm, and the *radial* and *ulnar* arteries, which are the branches of the brachial running down the lower arm.

Fracture of the upper end of the humerus may result from direct or indirect violence. The neck or narrow part underneath the head is the most frequent seat of the fracture, which may result from a fall upon the shoulder, or indirectly from a fall on the outstretched hand or elbow. The bone is usually broken transversely, and after reduction has been effected, there is little risk of displacement again occurring if proper precautions be taken. A pad is placed under the armpit, the A. bound to the side, and the wrist supported by a sling. Fracture of the shaft of the humerus is usually caused by a blow on the A. The pieces frequently fail to unite, as muscular contraction is difficult to overcome. If the fracture occurs above the insertion of the deltoid muscle, the A. is put in splints, bound to the side, and the forearm bent at right angles; if it occurs below the insertion of the deltoid, the A. should hang vertically. In either case the splints should be kept on for four or five weeks. Fractures of the lower end of the humerus are commonly caused by falls on the outstretched hand, and if not carefully treated may leave the patient with a stiff elbow. The fracture should be reduced under an anæsthetic, and the A. fixed with the elbow flexed as far as it will go. After a fortnight, passive movements should be commenced, and the amount of bending gradually increased.

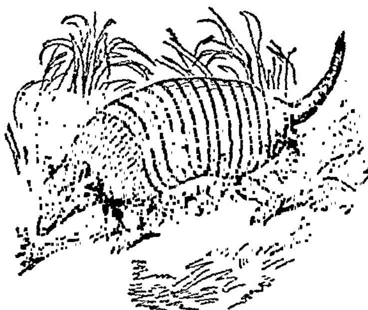
Of the bones of the forearm, the radius is more liable to fracture, but both may be broken by a direct blow or by a fall. If the fracture is badly set, Volkmann's Contracture may supervene. This is a condition in which the straightening of the wrist automatically flexes the fingers, which can only be extended again by bending the wrist. Colles's Fracture is a fracture of the lower end of the radius, from ¾ in. to 1½ in. above the

articular surface. It is usually caused by a fall on the open palm when the elbow is slightly flexed, and produces a cha[illegible] of the lower [illegible] When fixing [illegible] ngers shoul[illegible] that after [illegible] may move them freely; this is necessary in order that adhesion of the tendons to their sheaths may not occur.

Armada, Spanish. Armada is a Sp. word, signifying simply an armed force, but applied specially to the great Sp. fleet fitted out against England in 1588. Philip II., the then king of Spain, had resolved to strike a decisive blow at Protestantism b[illegible] which had [illegible] to him by [illegible] was under [illegible] of Medina [illegible] 130 great war galleons, with thirty smaller ships of war. It carried 19,295 marines, 8460 sailors, 2088 slaves, and 2360 guns. It was scattered by a storm when it left Lisbon on May 29, 1588, and had to put in to Corunna to be refitted. It passed through the English Channel towards Calais, as it was to work in co-operation with a land force collected in Flanders under the Duke of Parma. But instead of going to the coast of Flanders to take in the troops there, the Sp. admiral decided to sail directly to Plymouth and destroy the shipping in the harbour. In its progress the A. was attacked by the Eng. fleet under Lord Howard, with his lieutenants Drake, Hawkins, and Frobisher, who refused to come to [illegible] l the [illegible] ng in [illegible] The [illegible] and after six hours' furious fighting the Spaniards' best ships were shattered to pieces, and drifted upon the sand-banks of Holland with a N.W. wind. More than 4000 of their men had fallen, whilst not more than 100 of the Eng. had been killed. At a hasty council of war the Spaniards decided to return to Spain by sailing round the Orkneys. The Eng. ships were compelled to retire soon, owing to lack of powder, of which the ill-timed economy of Elizabeth had stinted them; but the storms of the northern seas finished the work of destruction. But fifty-four vessels of the 'glorious A.' returned to the ports of Spain, and those in a hapless plight. The inhab. of the Hebrides and the W. coast of Ireland treated the survivors from the vessels wrecked on their shores to a short shrift. The seamen and sailors who survived were so dispirited by their discomfiture that they were never weary of descanting upon the desperate valour of the Eng., and the unsurpassed violence of the tempestuous ocean which surrounds the British Isles. The Eng. queen had a medal struck bearing the inscription, 'Deus flavit, et dissipati sunt'—'God blew, and they were scattered.'

Armadale, tn. of Linlithgowshire, Scotland, 2½ m. S.W. of Bathgate. Near it are large chemical works. Pop. 4739.

Armadillo (genus Dasypus) is an edentate mammal peculiar to S. America, consisting of various species; [illegible] intermediate [illegible] the ant-eaters.



ARMADILLO

They are not, however, toothless, but have a variable number of simple [illegible] th [illegible] rd [illegible] n [illegible] s, and of movable cross bands of plates across the back. They are of nocturnal habits, feeding on insects, worms, fruits, and roots; they are inoffensive, and their flesh is edible.

Armageddon, in the Apocalypse, is the place of the 'battle of the great day of God,' when the last fight will take place between the powers of good and evil. Its name is indubitably taken from that famous battlefield (Judges v. 19) in the plain of Esdraelon, where the chief battles of the Israelites were fought.

Armagh, an inland co. of Ireland, in the prov. of Ulster, is bounded on the N. by Lough Neagh, on the E. by co. Down, on the S. by Louth, and on the W. by Monaghan and Tyrone. Its area is about 512 sq. m. The N.W. of the co. is undulating and fertile. The N., however, consists principally of extensive bogs, and on the S. border is a range of barren hills. The chief rivs. are the Blackwater, which separates A. from Tyrone; the Upper Bann, which discharges itself into Lough Neagh; and the Callan, which flows into the Blackwater. There are sev. small lakes. The geological features of A. are: Lower Silurian rocks in the S. and centre; the trap of Antrim, with the underlying greensand, in the dist. round Portadown; carboniferous limestone in the basins of the Blackwater and Callan; granite in the S.E. mts.; and Tertiary strata in the neighbourhood of Lough Neagh. Lead-veins have from time to time been worked in various parts of the co. The climate of A. is supposed to be one of the most genial in Ireland, with the least rainfall of any co., and it offers a relatively large area of cultivable soil. The number of cattle, sheep, pigs, and poultry is increasing. Agriculture, however, is not far advanced, the principal crops being oats and potatoes, but all grain crops are decreasing, and flax, which was formerly grown to a considerable extent, is now neglected. Owing to the linen industry, however, the inhabitants are generally in fairly comfortable circumstances. This manuf. is the principal one, though it has somewhat declined in modern times. Apples are grown in such quantities as to entitle the co. to its name, 'the orchard of Ireland.' Communications are monopolised by the Great Northern Railway, whose main line from Belfast divides at Portadown, sending off lines to Omagh, Clones, and Dublin. A branch from Omagh joins the Dublin line to Goraghwood, and from this line there is a branch to Newry in co. Down. An electric tramway connects Bessbrook, a tn. with important linen manufs., to Newry. Pop. 110,083; tn. 7356. The chief tns. are A. (7356), Lurgan (12,553), Portadown (11,727), and Bessbrook (2967). Assizes are held at A. The co. returns four members to the Parliament of N. Ireland and one to that of Great Britain and Ireland. The co. tn., A., is the see of an archbishop of the Protestant Episcopal Church, who is primate of all Ireland. It is of great antiquity, and has a Gothic building dating from the eighth century, and a Protestant as well as a Rom. Catholic cathedral.

Armagnac was the name formerly given to a dist. in the S. of France, a part of Gascony now generally included in the dept. of Gers. It has a fertile soil, and is noted for its wine and brandy. The inhabs. are strong and brave, but credulous and ignorant.

Armagnac, Counts of, were members of an anct. ruling family of the Fr. prov. of A.; they held sway from 1319 to 1525. The most celebrated member of this family was Bernard VII., who gave the name of A. to the faction which was *opposed* to the Burgundians in the civil war of 1410–35. In 1410 Bernard VII. married his daughter to the young Duke Charles of Orleans, and henceforth was the head of the Orleans, or A. party. The Burgundians, who were in reality the popular party, had on their side the university, the common people of Paris, and the powerful guild of the butchers, whilst the A., or aristocratic party, were supported by Queen Isabella and the princes and aristocracy of Paris. Parliament kept aloof from the struggle, supporting neither side. The A. faction had for their banner that of the A. family, a white flag, whilst the Burgundians carried the Cross of St. Andrew. The struggle of the rival parties was terminated in Sept. 1435 by the treaty of Arras, when the Burgundian court was reunited to that of France.

Armaments, Limitation of.—Determined attempts have been made since the Great War to secure some mitigation of the pre-war evil of unrestricted competition in armaments, and at the very outset of the peace negotiations at Paris in 1919 it was realised that without some such machinery as the League of Nations no advance was possible. Valuable principles are laid down in the Covenant of the League (*q.v.*), and in the subsequent period anxious and sustained attention has been given to consideration of ways and means. Article VIII of the Covenant opens with the statement that 'members of the League recognise that the maintenance of peace requires the reduction of national armaments to the lowest point consistent with national safety and the enforcement by common action of international obligations.' It then goes on to entrust the Council of the League with the task of formulating plans for the reduction of armaments and the supervision of the manufacture of munitions. That is as far as the framers of the Covenant ventured to go in the matter of disarmament, and, as experience has now shown, the task is a formidable one, the more so as the effective functioning of the League to any appreciable extent demands some solution of this problem. It was, however, a step

forward that a document of the importance of the Covenant should contain abstract or general propositions on the subject of disarmament, and that the League members should agree 'that the manufacture by private enterprise of munitions and implements of war was open to grave objections.' But though Mr. Lloyd George in March 1919 declared that unless an agreement between the Allies to prevent the competitive construction of fleets and other armaments were reached before the Covenant was signed, the League would be a 'sham and a mockery,' the framers of the Covenant were justified in refraining from attempting at that early stage to provide for all contingencies. The Covenant does at least provide that members should undertake to interchange full and frank information as to the scale of their armaments of all kinds. It also provides for setting up a permanent committee to advise the Council on the execution of the provisions of the Covenant on military, naval and air questions generally.

The whole question of the L. of A. is bound up with the closely related topics of Security and Arbitration, and it is clear that these topics are merely different aspects of the same problem; whence it is not surprising that the efforts of the past decade to find some promising avenue of approach to solution should be directed sometimes to the problem of Security, sometimes to Arbitration, and sometimes to Disarmament, moving, indeed, in a vicious circle. League discussions have shown that the problem of Security requires different solution for different nations. France, *e.g.*, has consistently maintained the necessity of creating some form of international super-State vested with the command of an international force, before she could consider the reduction of her armaments. In Feb. 1921 the Council appointed the Temporary Mixed Commission for the Reduction of Armaments, and that body considered the possibility of extending to land armaments the naval ratios adopted by the Washington Conference (*q.v.*); but eventually it reported to the League Assembly that no scheme could be effective which did not provide some form of national security as a *quid pro quo* for the reduction of national armaments. The Assembly adopted this principle in the Resolution (XIV) framed by Lord Robert Cecil and M. de Jouvenel; and thereupon the Commission began to draft a general Treaty of Mutual Guarantee or Assistance which the League adopted in 1923. It may be noted that in the meanwhile France pursued an independent line by occupying the Ruhr (*see* RUHR, OCCUPATION OF).

During the period 1920–23 the only effective agreements for the L. of A. were negotiated outside the League, and of these the most important was the Five Power Pact signed at Washington in 1922, by which the U.S.A., Great Britain, France, Italy, and Japan agreed on a limitation of capital ships and aircraft carriers for fifteen years in the ratio of 5 : 5 : 1·66 : 1·66 : 3. The maximum tonnage per country and per vessel was also fixed. This Pact, the importance of which must not be over-estimated, was useful in checking the increasing competition in that branch of armaments, and it also opened the way to the later naval conferences. In 1922 the Mixed Commission considered Lord Esher's proposal for the reduction of land armaments by the limitation of peace time effectives only, on a numerical basis corresponding with the ratio of pre-war strengths; but the proposal was rejected on the ground that no scheme could be effective which took no account of reserves and armaments as well as effectives. The real achievement of the Treaty of Mutual Assistance was to link up the problems of Security and Disarmament, but the Treaty itself was rejected by Great Britain on the ground, *inter alia*, that it would tend to revive military alliances within the League. In 1924 an attempt was made to find a solution of the three problems of Security, Arbitration and Disarmament in one document, namely the historic Geneva Protocol (*q.v.*). This document purported to rule out absolutely the legality of war except in certain cases; but again the British delegates rejected the solution, because, while it provided some solution of Arbitration and Security, it did not provide for the reduction of armaments and because it repeated the Fr. attempts, made in 1919 and 1923, to turn the League into an 'International Body' which should command an international force. A more eulogised solution was provided by the Locarno treaties (*q.v.*) though these do not, of course, rule out for all time the possibility of war even between the States represented at Locarno.

During 1926–27 the League concentrated its attention on the problem of disarmament by appointing a Preparatory Commission preliminary to a World Conference. This body, which replaced the dissolved Mixed Commission, was to devise ways and means to dispose of technical difficulties. As regards land armaments, it made an attempt to limit the effectives of the several signa-

ories and to cover arms and ammuni-ion by budgetary limitation, but eached no unanimity either on this branch or on that of naval armaments. The ensuing Coolidge Conference on naval disarmament broke down on the inadequacy of this preparatory technical consideration, it being clear that the Fr. solution of a maximum total tonnage only, and the British insistence on a maximum tonnage for each 'category' (*i.e.* for capital ships, carriers, submarines, etc.) were irreconcilable. Thus by the middle of 1928 relatively slight progress was made in the working out of the League Assembly's various resolutions on the three allied problems. In January 1930 the Five Powers (Great Britain, U.S.A., France, Italy and Japan) once more sent their delegates to a Conference to consider the further limitation of naval armaments. This Conference was opened in London by King George V, and during its three months' course negotiations twice broke down. It resulted, however, in a Three-Power Pact by which Great Britain, the U.S.A., and Japan would lay down none of the replacement capital ships of 35,000 tons each which they were entitled to build under the Washington Treaty during 1931–33 inclusive; and the U.S.A., Great Britain, and Japan undertook to proceed at once with the reduction of their capital ships in numbers to 15, 15, 9, respectively, instead of waiting until the expiration of the Washington Treaty. So far (1930), France and Italy remain outside the agreement so that it is still possible for those two Powers to increase their naval construction in such manner as to make it difficult for the Three-Power Pact to be maintained. This has necessitated a permissive clause in the Pact under which all three signatories may revise their programmes should the building plans of Powers outside the pact render that course necessary. *See* LONDON CONFERENCE, 1930. Consult J. W. Wheeler Bennett, *The Reduction of Armaments* (1925); Prof. P. J. Noel Baker, *Disarmament* (1926); C. Morison, *The Outlawry of War* (1927); Fred Alexander, *From Paris to Locarno* (Dent, 1928).

Armand-Dumaresq, Charles Edward (1826–95), a Fr. painter. His work consisted of military pictures, portraits, and water-colour drawings. The titles of some of his pictures are: 'Charge de la division Desvaux à Solferino,' 'Cambronne à Waterloo,' and the 'Défense de Saint-Quentin.'

Armandi, Peter Damian (1778–1855), an It. general, who was *b.* at Fusignano. He served in the Fr. army during the wars of the republic and of the empire; and took an active part in the cause of Italy, helping to defend Venice in 1849. He was appointed librarian at the castle of St. Cloud, where he *d.* His work entitled *L'Histoire militaire des Eléphants* was published in 1843.

Armansperg, Joseph Ludwig, Count von (1787–1853), Ger. statesman, *b.* at Rotzing. Attended Congress of Vienna, 1815; entered Chamber of Deputies, 1825; became Bavarian minister of foreign affairs, 1826, and minister of finances later in that year. His liberal views brought the opposition of the camarilla and Jesuits to bear upon him, and they forced his retirement in 1831. In 1833 he went to Greece as president of the Council of the regency for King Otho, and in 1835 became chancellor of state in Greece.

Armatoles, the name given to certain Gks. who, nominally under the Turkish gov., were in reality bandits; they helped Ali Pasha of Yannina in 1820, and the Gks. in 1830 against the Turks.

Armature, the arrangement of coils which in a dynamo passes through the magnetic field, thus inducing a current. The A. may be stationary and the magnets movable, or *vice versâ.*

The term is also applied to the piece of soft iron which connects the poles of a horse-shoe magnet when not in use. It affords a good path for the lines of force, and thus tends to retain the magnetism which is lost through an air gap.

Armbruster, John Michael (1761–1817), a Ger. journalist, was editor o the *Gazette de Zurich*, as well as o several Austrian papers. He was secre tary for the Swiss minister Lavater.

Armed Neutrality, a league of th northern powers of Europe—Russi Denmark, and Sweden—formed 1780, which first gave internation validity to the principle that 'fr ships make free goods.' A proclam tion of Catherine of Russia laid do that (1) neutral ships may sail fre from port to port and along the coa of belligerents, so long as they do carry contraband of war; (2) t only real and effectual blockade s be recognised. The doctrine accepted by Prussia and Austri 1781, but refused by Great Bri The league was suspended at peace of 1783, but revived in for a short time. The settleme the questions in international time law involved in the doctri the league was only made in 1 the declaration of Paris.

Armengaud, Charles, called Younger (1813–93), was the brot Jacques Eugène A., and was engineer. He collaborated wi

brother in sev. works on engineering.

Armengaud, Jacques Eugene, called A. the Elder (1810–91), a Fr. engineer and designer. He went to the School of Arts and Crafts at Châlons, and was appointed professor for designing the machines at the School of Arts and Crafts at Paris. He wrote various works on railways and machinery, in many of which he collaborated with his brother Charles.

Armengaud, Jean Germain Désiré (1797–1869), a Fr. writer. He devoted his time to the study of art, visited the museums of Europe, and became a great critic. Amongst his works are: *L'Histoire des peintres de toutes les écoles, depuis la Renaissance jusqu' à nos jours*, 1849; *Les Galéries publiques de l'Europe*, 1856–65; and *Les Chefs-d'œuvre de Rubens à la cathédrale d'Anvers*, 1859.

Armenia (or Hyastan).—A Socialist Soviet Republic, occupying uplands between the Persian plateau and Asia Minor and bounded on the N. by the Black Sea, on the S. by Kurdistan, on the E. by Azerbaijan, and on the W. by Turkey. Before the Great War A. comprised the whole of the lofty tableland in the Upper valleys of the Euphrates, Tigris, Aras, and Kur; it was 400 to 500 m. long, about the same in breadth, and covered about 63,000 sq. m. It had ceased, however, to exist politically long before the Great War and was shared between Turkey, Persia, and Russia. The area of the present republic of A. is no more than 11,680 sq. m. It will be convenient in describing the physical features of A., to include the whole of the old tableland, which, intersected by the Tigris, was formerly divided into A. Major and A. Minor. This country is an elevated plateau, partly surrounded by the ranges of Taurus and Anti-Taurus, and in part occupied by other mts., of which M. Ararat is the highest. To the E. of the valley of the Aras, the plateau of Kara Bagh reaches a height of 11,000 ft. The mt. system is mostly volcanic, trachyte and augite porphyry being mainly represented. The numerous cones are for the most part old craters. The Murad Su (E.), and the Kara Su (W.) Euphrates form the headquarters of that riv. The headquarters of the Tigris are formed by the Shett, rising to the S. of Van Lake, and an arm of the Diarbekr, rising in the Alinjik Dagh. Even the present diminished A. can still claim that the Rs. Euphrates, Tigris, Kur, and Tchorokh all take their rise within its boundaries. There are three climatic regions distinguished in A. A region of rains, with a sub-tropical climate, extends along the valley of the Kur from Iflis to the Caspian Sea and the valley of the Upper Tigris; a region of perpetual snow, which on Mt. Ararat, the meeting of the former Russian, Turkish and Persian boundaries, save on the north-western side, starts as high as 14,000 ft., but which elsewhere does not begin till at a height of about 11,000 ft.; and an intermediate region, of various grades, including the plateau chains, to a height of 12,000 to 13,000 ft. The last-named zone ranges from a S. European climate on the plain of the Kara Hissar to a mid-European climate, with a late harvest, on the mid-slopes of the frontier mts. The volcanic, dry and treeless, plateaus have a very severe climate, with long and bitter winters, and short summers, very hot during the day, but invariably cold at night. The cold N. winds give rise to the storms which render the navigation of the Black Sea fraught with such great danger. Much the richest belt of vegetation is the broad valley of the Aras; but the marshes, caused by the number of irrigating channels, render this the most unhealthy part of A. Since the estab. of the Soviet Gov. irrigation works have been restored or constructed to a total length of nearly 190 m. There are, however, rich orchards and vineyards, and fields of tobacco, rice, hemp, flax, and cotton. A little corn is cultivated, but the high tablelands are chiefly pastoral in character. The history of A. has been largely influenced by its physical features. The isolation of the valleys, especially in winter, encouraged a tendency to separation, which invariably showed itself when the central power was weak. The mts. have always served as the breeding-place of the independent and proud-spirited mountaineers, and as the sanctuary in times of invasion for the lowlanders. The country stood as an open doorway between the E. and the W. It connected the Iranian plateau with the protected harbours and fruitful lands of Asia Minor, and nations have striven for its possession from the remotest periods of antiquity. The original inhab. of A. are unknown, but about the middle of the ninth century B.C. the mass of the people belonged to that great family of tribes which seems to have been spread over the W. part of Asia, and to have had a common non-Aryan speech. There was, however, intermingled with this race an important Semitic element of Assyrian and Hebrew origin. Between 640 and 600 B.C., the country was conquered by an Aryan people, forming a military aristocracy that was recruited from

Persia and Parthia. They imposed their language, and possibly their name, upon the conquered inhabs., though apparently but a small amount of intermarriage took place. Many of the Aryan and Semitic Armenians migrated to Constantinople and Cilicia, after the Arab and Seljuk invasions; and the remains of the aristocracy were swept away by the Mongols and Tartars. The diversity of type and characteristics existing amongst the modern Armenians may be due to this fact. In the recesses of Mt. Taurus the peasants are tall, good-looking, agile, and brave. In A. and Asia Minor they are robust, thick-set, and coarse-featured, with straight black hair and large hooked noses. They are good cultivators of the soil, but are ignorant, poor, and superstitious; they still inhabit the same type of semi-subterranean dwellings as did their ancestors in 800 B.C. The townsmen have more regular features, approximating in many cases to the Persian type. They are remarkable for their industry, their aptitude for affairs, and their keen intelligence. They possess the same enterprising spirit which led their ancestors in Rom. times to trade with Scythia, China, and India. They are skilled artisans, bankers, and merchants, and many of the aristocracy have occupied positions in the public service of Turkey, Russia, Persia, and Egypt. The Armenians are essentially an Oriental race; they have, like the Jews, whom they also resemble in their widespread dispersion and their exclusiveness, a remarkable indissolubility of national character and faculty of adaptation to circumstances. They are frugal, sober, and intelligent, strongly attached to old manners and customs, but with a promising desire for progress. On the other hand, they are greedy of gain, self-seeking, and unstable in character, and with a love of intrigue which has had an unfortunate influence on their history. They are deeply separated by religious differences; and the want of courage and self reliance, sometimes noticed in connection with them, is doubtless due to a long period of servitude under an alien and overbearing government.

All kinds of cereals, cotton, sesame, flax, and hemp, rice and tobacco are produced in the valleys and plains; silk-worm breeding, sheep-rearing, and fruit culture are all capable of great development. There are large untapped mineral resources. Naphtha, bitumen, sulphur, and nitre are found, and the mts. yield precious metals, copper, iron, lead, marbles, and salts. Numerous hot and cold mineral springs abound, comparable, almost, to those of Vichy. There is a large carpet industry. The capital is Erivan (pop. 90,000). The next tn. is Leninakhan, formerly Alexandropol (50,000).

The Armenians called themselves Haik, whence the Persian name of A., Hajastan; the Medes applied the name of a single obscure clan, A., to the whole land. Under this name they have been known as a nation since the time of Herodotus. Little is known of the early history of A., but it was a separate state as early as the eighth century B.C., when it became subject to Assyria, as it subsequently did to the Medes and the Persians. It was conquered by Alexander the Great in 325 B.C., but regained its independence c. 190 B.C. Its king, Tigranes, son-in-law of the celebrated Mithridates, after having been defeated by the Roms. under Lucullus and Pompey, c. 69 B.C., was left on the throne. Shapur, the second of the Sassanid kings, conquered A., but under Diocletian it was recovered for Rome, and Tiridates the Great returned to the throne This Tiridates having been converted to Christianity by St. Gregory the Enlightener, A. became henceforward the bulwark of Christianity in Asia. After many vicissitudes of fortune it re-emerged in the ninth century into a state of considerable importance. In A.D. 885 Aschod I., who came of an old and powerful Armenian family, ascended the throne with the permission of the califs. He founded the third Armenian dynasty, that of the Bagratidæ, who claim descent from King David of Israel. The imposing ruins of their cap. at Ali, between Etchmiadzin and Kars, show that the kingdom prospered under their rule. Their dynasty lasted till the eleventh century, when the Gks. seized a part of the kingdom, weakened as it was by internal dissensions, and killed the last king of the Bagratidæ; the Turks and Kurds overran most of the remainder, a few chiefs with difficulty preserving their local autonomy. The whole of A. Major was conquered by the Mongols in 1242. The last king of A., Leon VI., was taken prisoner by the Saracens in 1375. The E. part of A. became a Persian prov. in 1472, and the W. part was afterwards taken possession of by the Turkish Sultan, Selim II. For a long time now A. was laid waste by the Mongols and the hosts of Timur, and fought for by the Ottoman sultans and Persia, till Russia at length gained possession of the whole of the upper valley of the Araxes. According to travellers, the Armenians enjoyed security of person and protection under the Russians,

such as neither Turkey nor Persia granted to them. At the close of the Russo-Turkish War, Ardahan and Kars were ceded to Russia by the treaty of Berlin, 1878, thereby adding 6687 sq. m. and 271,000 persons to Russian suzerainty. There is no doubt that amongst the Armenians themselves at this period there was a widespread desire that Russia should be their ruler, if any nation were. Great Britain on this occasion secretly guaranteed that Turkey should retain her Asiatic possessions on condition that she should bring about reforms, and protect the Armenians from the Kurds and the Circassians.

The conversion of King Tiridates, mentioned above, is the earliest authentic account of the introduction of Christianity into A. In the same century Armenian Christians studied at Athens. In the eccles. monophysitic controversies of the fifth century concerning the nature of Christ, the Armenian Christians refused to accept the decisions of the Council of Chalcedon, and constituted themselves a separate church. The popes have at various times attempted to force them into reunion with the Roman Catholic Church, but have not succeeded in bringing about a lasting agreement. There are, however, a small and scattered number of United Armenians, who, whilst acknowledging the spiritual supremacy of the pope, retain their own ceremonies and discipline. The far greater part, however, have remained faithful Monophysites. The chief points of difference between their doctrine and the orthodox one are, that they admit only one nature in Christ, and believe the Holy Spirit to proceed from the Father alone. Their sacraments are seven in number. They adore saints and images, their hierarchy being similar to that of the Gk. Church, but they do not believe in purgatory. The Catholicus, or head of the church, to whom the Armenian patriarchs of Jerusalem and Constantinople are subordinate, has his eat at Etchmiadzin, a monastery ear Erivan. This monastery, with hich is connected a seminary for eological students, has been the cles. metropolis of the Armenian tion since A.D. 302, and claims to be e oldest monastic foundation in the rld.

The Armenian language belongs to Indo-European family of lanages, and is most closely connected h the Iranic group. The old nenian or Haikan language is still literary and eccles. medium, and istinguished from the ordinary en Armenian, which is of more ern origin, and contains a large proportion of Persian and Turk elements. The language as a wh has many peculiarities of structu There are seven cases, and no distin tion of gender amongst nouns; whi there are in verbs four conjugatio and four tenses. The E. diale is much purer than that of Constant nople. The language has gre strength and flexibility, but is con sonantal and harsh to the ear. Th alphabet has thirty-six characters No literary remains of the perio before the introduction of Christianity exist save a few old songs and ballads. These suffice to show that the Armenians had adhered to the Assyrian or Medo-Persian system of culture. The Gk. language and literature soon became favourite objects of study, and many Armenian translations were made. At a later period the Gk. alpabet was used by the W., and Syriac by the E. Armenians. In the beginning of the fifth century St. Mesrob, with Sabak the Great, wrote the Armenian translation of the Bible, which was esteemed the highest model of classic style. The most flourishing period of Armenian literature extends from the fourth to the fourteenth century. During this period many Armenian theological writers and chroniclers flourished. In the fourteenth century literature began to decline, and few works worthy of note were produced after this period; but since their dispersion the Armenians have always cherished their national literature. Armenian literature was purely monkish; there was not, as in the neighbouring co. of Georgia, any epic or romantic literature. A considerable stirring of intellectual and literary activity has of late years manifested itself both at Erivan and in Constantinople.

In the Great War A. was a coveted pawn in Germany's 'Drang nach Osten' dreams. Its mts. dominated the centre of the Berlin to Baghdad route. It was essential to the fulfilment of this dream that a vigorous campaign should be waged in A., so as to drive out the Allied forces and thereby, ultimately, gain control of the Persian Gulf and the gate to India. In 1915 the Grand Duke Nicholas had concentrated in the Caucasus an army of 200,000 men for a great offensive in A. in the early months of 1916. Owing to the British setback in Mesopotamia in the autumn of 1915 he launched the attack much earlier than he had intended. The Turks were heavily defeated near Erzerum (Jan. 16, 1916) and by the middle of February the seemingly impregnable forts of Erzerum had been conquered and the tn. itself was hastily evacu-

normous booty falling into of General Yudenitch. By brilliant strategy of the ke had resulted in the fall of d the capture of the im- n. of Trebizond. Everywhere cavalry relentlessly pursued oralised Turks, and nearly the f the Turkish A. was now grasp of the Russian armies. ily for Allied hopes, the ous issue of Gallipoli set free rge Turkish army of that ula. Kut was besieged and al Townshend surrendered 29, 1916). Thereafter, though ussians captured Erzingan, their er advance was checked. Soon had to abandon Bitlis again, and eforth the Grand Duke was on defensive.

1918, during the Russian Revolu- , an independent 'Republic of ns-Caucasia' was formed by the on of A. with Azerbaijan and orgia. The 'Settlement' satis- the Socialistic propagandists of oscow as well as those crafty cham- ons of the *Mittel Europa* dogma hose efforts were directed to de- ching as many states from Russia as ossible and giving them a hazardous utonomy dependent on themselves. This Union, however, was dissolved in 1918, when the Allies recognised the independence of the Armenian republic. By the treaty of May 11, 1920, Turkey, too, recognised A.'s independence. Previously a mandate under the League of Nations had been offered to the U.S.A., but was not accepted.

Massacres.—In 1915 Christian A. was for the greater part of the year the scene of the most devastating massacres in the tragic history of that ill-starred race. In these massacres the most abominable cruelties were practised. Moslem eyewitnesses re- cord that in the suburbs of Mush they saw large numbers of Armenian men, women and children lying in the fields. Some had been shot, some stabbed, and nearly all horribly mutilated. A great many women and girls were sold to Turkish harems and houses of ill-fame. On the way, from Mush to Hinis piles of bodies were seen lying at short intervals by the roadside, and between Hinis and Skerkis-Keui were seen two ravines filled with corpses, mostly of men, there being about 400 in each ravine. The Turks had, in fact, aimed at and nearly succeeded in exterminating an entire race, in order to destroy any possible chance of A. acquiring autonomy then or at any future time; and such protesting voices as were raised were, in the nature of things, few and ineffective. Further mass- acres took place at the time of the revival of Turkish aspirations in Europe and the Græco-Turkish War, 1922, and mobs of wretched refugees flocked into Baqubah in Iraq to seek the protection of the British authori- ties, and later were sent down to Basra.

Armenian Atrocities. After the change in Russian policy and the failure of the powers to secure re- forms, following on the treaty of Ber- lin, the advanced party amongst the As. determined to try to produce dis- turbances such as those that had given birth to Bulgaria, and so gain their object. Steeped in Nihilistic doctrine, they formed various secret societies, such as the Hunt- chagist, and carried on an active propaganda in Turkish Armenia. The revolutionary movement, though joined by some of the younger men, was strongly opposed by the A. clergy and the American missionaries; whilst its irreligion, and the self-seeking of its leaders, rendered it unacceptable to the mass of the people. At last, ex- asperated by their lack of progress, the emissaries on Jan. 5, 1893, posted revolutionary placards at Yuz- gat, and on the walls of the American College at Marsivan. Their object was to compromise the missionaries; in this they were successful, and out- breaks followed at Kaisarieh and elsewhere, but were easily suppressed. In the summer of 1893 an emissary was captured near Mush, and a raid was made on the dist. by the Kurdish Irregular Horse, acting on the orders of the governor. The As. held their own both then and again when they were attacked in the spring of 1894. The sultan then issued a firman call- ing upon all loyal subjects to aid in suppressing the revolt, and regular troops were called up from Erzengan. A massacre of a most brutal character ensued, which aroused great indigna- tion in Europe. In Nov. 1894 a Turkish commission of inquiry was sent to Armenia, accompanied by the consular delegates of Great Britain, France, and Russia, who elicited the fact that the action of the authorities was not justified. The country was in an exceedingly restless state, and though Great Britain pressed for re- forms and was in favour of coercion o the sultan to agreement with a reform scheme proposed, she was not sup ported by the other powers. Durin the negotiations, in the course which Lord Salisbury's gov. displac that of Lord Rosebery in Englan disturbances had occurred, and Trebizond a massacre took place Oct. 8, 1895. On Oct 17 follow the sultan accepted the scheme reforms, but refused to publish it, in Armenia massacre followed m

acre in quick succession until Jan. 1, 1896. In the summer of 1896 there were massacres at Van Egin and Inksar; and on Aug. 26 the Imperial Ottoman Bank at Constantinople was seized by revolutionists as a protest against the Christian powers who had left the As. to their fate. The gov. had had warning of this, and at once turned loose the rabble, previously armed and instructed, on the streets; a two days' massacre followed, during which from 6000 to 7000 Gregorian Armenians perished.

The massacres were apparently carried out on a well-organised plan, occurring in most cases in the vilayets to which the scheme of reforms was to apply. They were confined to Gregorian Armenians, as the Roman Catholics were protected by France, the Gk. Christians by Russia. Orders were given to protect foreigners, and in some cases guards were placed over their houses. The cause of the damage done to the American buildings at Kharput was direct disobedience to orders. The attacks on the bazaars were made during business hours, when the men were in their shops and the women at home; explicit promises were in some cases made that those who opened their shops would be in no danger, but these were deliberately broken. Those who would have had a share in t...

forms were

was destroye

...

received honourable terms after three months' fighting. The actual perpetrators of the massacres were the local Moslems, aided by Lazis, Kurds, and Circassians. Though many Moslems disapproved of the massacres, the lower orders were excited by false reports and by cupidity. No one was punished for the massacres, but many were rewarded. Men and women were butchered in prisons and churches; schools, houses, and churches were plundered, and the destruction of property was enormous; the number of those that were killed was from 25,000 to 33,000, including those at Constantinople. Efforts by Great Britain and the U.S.A. ...

...

tinued their propaganda down to the granting of the Turkish constitution in 1908; ...

occurred

Mush in 1... and Van in 1908. (See also previous article for Atrocities during and after the Great War.)

Armentières, a Fr. tn. in Nord, 10 m. W.N.W. of Lille, on the R. Lys, has manufs. of linen and cotton goods, lace, soap, etc., and a large trade in grain. It was the centre of the heaviest fighting in the Battle of Picardy during the great and final drive against the British armies (March 1918). In 1914, during the race to the Channel Ports, the Gers. captured the tn., but were driven out by the British, who occupied it until March 1918 when the Gers. overwhelmed it with shell-fire (2nd Somme Battle). Pop. 14,758.

Armfelt, Gustav Moritz, Count of ... land. He ... urage and ... on Sweden ... s military ... III. con- ... He went as ambassador to Naples, and entered into correspondence there with certain parties in Sweden for the purpose of overthrowing the regency, which was in the hands of the Duke of Sudermania. The plot was discovered and he was deprived of all his powers and titles. He was restored to favour and honour in 1799, when Gustavus IV. received the crown. He was afterwards obliged to flee to Russia, being implicated in the poisoning of the Prince of Augustenburg. There he received high honours.

Armiak, cloth woven of camel's hair by the Tartars, also a caftan made of *armiak*.

Armida was a beautiful sorceress in Tasso's *Jerusalem Delivered*, who was employed to seduce the Crusaders as they approach... the Holy City. Her witchcraft was overcome by Rinaldo, who confessed his love for her, and prevailed on her to become a Christian.

Armiger, *see* ESQUIRE.

Armilla (Lat., ring), a bracelet which was worn by both sexes among the Medes, Persians, Gauls, and Sabines. Both Gks. and Roms. looked upon them as feminine adornments, but in some cases of signal merit an A. was conferred publicly upon Rom. soldiers.

Armillary Sphere. The Lat. word *armilla* signifies a bracelet, and an A. S. is one in which the principal circles of the heavens are shown by means of metal rings put together in their relative positions. By its means many observations and calculations were made by ... but its use for ... astronomical ... superseded by the celestial globe.

Armin, Friedrich B. (*b.* 1851), Ger. ...

...Regt. July 16, 1870, and went through the Franco-Prussian War, being

d at St. Privat. Joined staff in 1884 and became r of general war dept., 1903. 1 he was made general in nd of the 4th Army Corps at burg; and in the Great War he t corps into Flanders with the d 6th Armies. On March 1, he was appointed to command th Army, and with it he took entières and Kemmel. He re- in 1919.

min, **Robert**, a comic actor and or, was a contemporary of Shake- re. He was a pupil of the famous r Tarleton, and amongst other . actors visited Scotland. He was of the players licensed by James and he played in Shakespeare's amas. His works are *The Italian ylor and his Boy*, 1609; *A Nest of innies*, 1608; and *The History of e Two Maids of Moreclacke*, a rama printed in 1609.

Armine, Sir William (1593–1651), vas a Parliamentarian, and became I.P. for Boston, Grantham, and Lincolnshire. He refused to levy an arbitrary loan in Lincolnshire and was imprisoned. He was afterwards sheriff of Lincolnshire, and of Huntingdonshire; and a member of the council of state, 1649, 1650, and 1651.

Arminians, *see* ARMINIUS, JACOBUS.

Arminius, a famous chief of the Ger. tribe of the Cherusci, was *b.* 16 B.C. Sent as a hostage to Rome, he served in the Rom. army, and reached the rank of eques. Returning home, he placed himself at the head of the discontented tribes near the Rhine, and completely annihilated the Rom. army under the governor, Quintilius Varus. He was assassinated in A.D. 19, having been suspected of aiming at kingly power. A monument to his memory was unveiled near Detmold in 1875.

Arminius, Jacobus, or **Jakob Harmensen**, founder of Arminianism, was *b.* in 1560 at Oudewater in S. Holland. He studied in the university of Leyden, and at Geneva, where his chief theological tutor was Theodore Beza. He was appointed minister of a church in Amsterdam on his return, and was chosen to refute a work which was totally opposed to Beza's doctrine of predestination. He was, however, convinced by the arguments of the work, and on declaring his opinions openly in 1603, he was to the end of his life engaged in a series of bitter disputes with his opponents. A. asserted that God bestows forgiveness and eternal life on all who repent of their sins and believe in Christ; Francis Gomar and his party maintained that God had by an eternal decree predestinated what persons should be saved. A. died of a complicated disease in 1609.

Armistice is a temporary suspension of hostilities between two opposing belligerent powers by mutual agreement. It is sometimes concluded for a few hours to allow of a parley, burying of the dead, etc.; a general A. is the usual preliminary to a peace. The dates of the various A.'s in the Great War were: Central Empires–Rumania–Russia, Nov. 29, 1917; Central Empires, Dec. 7, 1917; Central Empires–Ukraine, Feb. 9, 1918; Allies–Bulgaria, Sept. 29, 1918; Allies–Turkey, Oct. 30, 1918; Allies–Austro-Hungary, Nov. 3, 1918; Allies–Germany, Nov. 11, 1918. A general, as opposed to a partial or local A., suspends all military and naval operations of the belligerents and, being concluded by the commanders-in-chief on behalf of their respective govs., requires ratification. The famous A. of Nov. 11, 1918, was concluded by Marshal Foch and Admiral Wemyss for the Allies with the civil and military representatives of Germany. The Allied representatives were, however, acting under the fullest instructions from the Supreme War Council in Versailles. This A. was modified several times before ratification, and under it the Gers. had to evacuate the invaded territories, including Alsace-Lorraine, within a fortnight and fall back to a stated distance beyond the Rhine, thereby establishing a neutral zone, and obviating any possibility of collision between the troops. Germany was to bear the cost of maintaining the Armies of Occupation in the Rhineland and Alsace-Lorraine. The other primary conditions imposed on Germany included the surrender of ten battleships, fourteen battle cruisers and light cruisers, fifty modern destroyers, and all her U-boats; also 5000 heavy and field guns, 30,000 machine guns, and 200 aeroplanes, besides a large quantity of rolling-stock and lorries.

The Treaty of Versailles, conclude in 1919, embodied these provisio with, of course, extensive addition In the forest of Compiègne is an monument situated in a *Carrefour l'Armistice*, which was unveiled Nov. 11, 1922. It marks the s where the Gers. signed the A. bears the inscription: "Ici le Novembre 1918 succomba le crim orgueil de l'Empire Allemand va par les peuples libres qu'il préten asservir." There exists no si monument in England, but the taph in Whitehall serves muc same purpose.

Armisticio, a ter. of Vene bounded by the states of Los.

Lamora, Baliva, and the United States of Colombia. Area about 7100 sq. m. The region is fertile, being well watered by the tribs. of the R. Orinoco.

Armitage, Edward, an Eng. historical and mural painter, was *b.* in London on May 20, 1817, and studied in Paris. After a year's study in Rome, he visited the Crimea during the war, and on his return painted two vivid war pictures. He was made an associate of the Royal Academy in 1867, a fellow in 1872, and was appointed lecturer in painting thereto in 1875. His compositions, largely scriptural in character, are marked by a powerful breadth and boldness, but lack warmth in the colouring. He died on May 30, 1896.

Armley, formerly township of West Riding, Yorkshire, England, on R. Aire, formed part of Leeds by Leeds Corporation Act 1926.

Armorial Bearings, a general term for heraldic insignia. Strictly speaking, it should be confined to those devices 'borne' on the shield.

Armorica was the country of the Armorici, who occupied the coast of Gaul between the Seine and the Loire in the first century B.C. In later times the name was confined to Brittany.

Armour is a general term for equipment of personal defence, as distinguished from arms or weapons of offence. The commonest implement of defence in the earliest recorded history of Europe was the shield. The shields of this early period were of bronze and round in shape, being held in the left hand by a handle under the central boss.—The early Gks. also used greaves and helmets of bronze, and a cuirass of breast and back plates was in later times used in addition. The cuirass of the Roms. was shaped to the figure, and furnished with shoulder-guards and a series of pendent plates which extended almost to the middle of the thigh. The date of the introduction into Europe of the tunic of linked rings, or coat of mail, is unknown. The Rom. hastati wore flexible cuirasses, but distinct evidence of how they were constructed is not in existence. Portions of chain mail have been found in the mosses of Sleswick, dating back to the third century. Long before the time of the Crusades chain mail was in general use among the northern nations. The Holy War, however, kindled an enthusiasm for this species of personal defence, and under the feudal system the period of the principal development of body armour was reached. Every man had the arms and A. which appertained to his rank and condition. The common mass of combatants wore a suit of quilted or padded leather, sometimes studded with small plaques of iron or steel; the higher classes, the knights and nobles, were apparelled in gorgeous and costly suits of A. The lines of demarcation between the various periods in A. are as strongly marked as the different fashions of dress. In the eleventh and twelfth centuries the A. consisted of a hauberk or tunic of mail for the body, hose of mail for the legs, a conical helmet, and a circular or kite-shaped shield. Towards the end of the twelfth century the round shield became rare, being superseded by triangular or flat-iron shaped shields. Helmets changed from the conical to the cylindrical and flat-topped form. [illegible] the second [illegible], the mail [illegible] reinforced by shoulder-pieces, elbow- and knee-pieces, and greaves, or shin-pieces. The A. was also extended from the man to the horse. The fourteenth century, the period of the greatest development of A., was marked also by the transition from the coat of mail to the panoply of plate. Four or five different casings were worn over each other, the surcoat, bearing the knightly emblazonment, being worn uppermost. The hauberk terminated at the neck, which was protected by a gorget of scale or plate. An ample corselet fortified the breast; and elbows, hands, and shoulders had each their special defences. Tubular jambards completely encased the legs, whilst the feet were enclosed in sollerets of articulated plates. The hood of chain was discarded for the bassinet, a high peaked cap of steel. The helm, perforated with small clusters of holes for breathing, completely covered the head and face; but before the close of the century the helm was to a large extent superseded by the visored bassinet and camail. The shields were still triangular, but shorter than in the previous century; costly belts were worn over the surcoat. Further developments took place, and body and limbs were completely encased in an articulated casing of iron plates by the middle of the fifteenth century. But the introduction of gunpowder caused the decline of A.; the sixteenth was the century of transition, but by the end of that century the full suit of war harness was an antique survival. It was used a little by pikemen in the seventeenth century, but in the eighteenth body A. had been reduced to a mere embellishment of the military parade.

Armour [illegible] Toronto. Called to the bar in 1853; began to practise in Cobourg; became county crown *attorney for* Northum-

d and Durham, 1858; clerk of peace, 1861; queen's counsel, ; bencher of Law Society of r Canada, 1871; puisne judge ourt of Queen's Bench, 1877; justice of the court, 1887. In 5 he was made commissioner to se the Ontario statutes; in 1900 ef justice of Ontario and president the Court of Appeal; in 1902 a ge of the Supreme Court of nada. He *d.* in London while ting on the arbitration tribunal the Alaskan boundary dispute.

Armour, Jonathan Ogden (1863–927), an American capitalist, famous n connection with corned-beef; *b.* at Milwaukee, Wisconsin, son of Philip). Armour (*q.v.*). Entered Yale, but eft before graduating to join his father's firm. He succeeded to control on his father's death (1901), and became president of Armour & Co., besides director in all allied companies. Author of *The Packers and the People*, 1906.

Armour, Philip Danforth (1832–1901), American merchant and philanthropist, born at Stockbridge, N.Y. In 1863 he founded the firm of A., Plankington & Co., pork packers, at Milwaukee. In 1870 the firm removed to Chicago and was reorganised as A. and Co., becoming the largest of its kind in the world. Mr. A. founded the A. Institute of Technology and the A. Mission in Chicago.

Armour Institute of Technology, an institution for the advancement of technical education in Chicago, founded in 1892 by Philip D. Armour, and consisting of a technical college, a department of commercial tests, and the scientific academy, giving four-year courses in engineering, architecture, etc.

Armoured Cars. A. C. form part of the Tank Corps and are organised into Companies. A Company consists of four sections of four cars each, with one extra car. A few years ago the A. C. was regarded as superior to the tank in speed, reliability and ease of maintenance. To-day (1930) light tanks attain a speed of 30 m. or more and are still in an evolutionary stage. In the Great War conditions on the Western Front only favoured the use of A. C. in the later phases, and they were mainly employed in Egypt, Mesopotamia, Ger. E. Africa, Palestine, the Indian Frontier and Persia, and in these regions they played an important part both in conjunction with cavalry or other troops and as independent units. Medium type A. C. are armed with a machine gun carried in a single revolving armoured turret. The engine and petrol tank are also armoured. The maximum speed is 60 m.p.h., and the radius of action without carrying extra petrol is 400 to 500 m. on good roads and half that distance on loose ground. The crew, including car commander and driver, numbers four. The general functions of A. C. are reconnaissance and operation as advance guards or rear-guards. They may sometimes be useful for augmenting outposts, and can also be used for independent missions, such as seizing important tactical points in advance or on the flank of the enemy. A. C. are especially useful in co-operating with cavalry, for they can relieve cavalry of tasks entailing extensive movements and, during an advance, can locate and repel slight opposition before the cavalry approach. For patrol work A. C. are invaluable, as was proved in Shanghai in 1927–28. In 1928 it was proposed to convert two regular cavalry regiments into A. C. regiments, of combined squadrons of A. C. and light tanks operating either wholly as mechanised units or partly as cavalry by retaining two squadrons of sabres and adding one of A. C.

Arms (Lat. *arma*, arms). From the earliest times man's ingenuity has devised weapons of offence and defence. The oldest relics we have are of stone weapons, these in course of time being superseded by bronze and iron. The heads of battle-axes, spears, and arrows made of stone have been found in many parts of the world, the only defensive armour commonly used contemporaneously being shields. With the advent of bronze and, shortly after, iron we find swords of variou shapes becoming almost universal while means of protection also greatl increase. The Gks. had shields, helmets, greaves, and cuirasses of bronze their offensive weapons, usually ma of the same metal, consisted of the spears, lances, javelins, and swor Homer, in his works, describes th arms, and refers in the *Odyssey* to use of the bow. In his time, howev the principal weapon was the sp the sword being short and used close quarters for stabbing. The tective armour was heavy, and a quilted coat was substituted fo cuirass. The size of the shields was reduced from time to time older forms, being sufficiently la cover the whole body, became noticeably cumbersome with t creased use of the sword. The had much the same armou generally of iron and lighter th of the Gks. The Gk. shield was or oval, while the Roms. h common forms, one small and r or oval, the other large and re lar. The Rom. shield was co of wood, hide bound, and p

at Princeton University (then college of New Jersey) and served in the War of Independence; was a member of Senate and U.S. minister to France, and together with Bowdoin treated with Spain *re* Florida and the Louisiana boundary. Was for some time Secretary of War under Madison. He wrote *Notices of the War of* 1812.

Armstrong, Robert Archibald (1788–1867), was *b.* at Kenmore, Perthshire, and educated at the universities of St. Andrews and Edinburgh. He compiled a *Gaelic Dictionary* in 1825, which was a pioneer work of its kind, and also contributed to sev. periodicals.

Armstrong, Samuel Chapman (1839–93), an American soldier and philanthropist, *b.* in the Hawaiian Is. Son of missionary parents; served on the Union side in the Civil War, and acquired distinction as a commander of Negro troops; in 1866 he was made superintendent of the Ninth District of Virginia under the Freedman's Bureau. Founded the Hampton Institute for Negroes and (later) Indians. He was interested in the 'Indian Question.'

Armstrong, William, or 'Kinmont Willie,' a famous moss-trooper of Sark in Dumfriesshire. Captured in 1596, he was imprisoned in Carlisle Castle by the Eng. warden and rescued by Scott of Buccleuch.

Armstrong, Sir William George (1810–1900). Born at Newcastle-on-Tyne, he was articled to a firm of solicitors, and afterwards became a partner. His tastes, however, lay elsewhere, and, in 1840, he produced an improved hydraulic engine, and, [illegible]

Britain in 1891, and, in addition to receiving recognition from several foreign countries, he served as president of the Institute of Mechanical Engineers and of the Institution of Civil Engineers.

Army. *General sketch of the history of armies.*—From the beginning of the history of the world we have evidence that more or less organised As. played a prominent part in the history of their countries. The early oriental nations, such as Egypt, Assyria, and Persia, all possessed large As., which were easily raised and placed in the field in time of war. A standing A. was, of course, not known, except in so far as the kings had special corps of picked soldiers to act as their bodyguard and to form a nucleus for an A. in time of war. The earliest A. of which we have any record is that of the Egyptian Rameses II., who ascended the throne of Egypt about the year 1300 B.C. He, with an A. which numbered well over a million, is supposed to have conquered W. Asia right up to the boundaries of India. To him also is ascribed the formation of a warrior caste, the members of which had to serve in his As. when necessary, had certain of the taxes remitted as a kind of retaining fee, and were also granted military fiefs. Herodotus describes the A. gathered together by Xerxes, and which, according to his computation, numbered well over two millions of men. This A. took full four years to mobilise, and it was only at the end of the fifth year that Xerxes and his A. set forth on their campaign. The method of raising the forces is given

said to have existed. Every citizen of Athens had to serve in the A. and had to undergo military training during a given period, after which he was placed in a certain reserve section of the A., and was liable to service when called upon. In many cases military service formed the basis for political gov. The A. was divided into infantry and cavalry, the greater part of the pop. serving as infantry, while the richer men formed the cavalry. For some very long period, however, the cavalry was a very secondary part of the Gk. A. In Sparta the whole nation was the A., every man being compelled to serve between the ages of eighteen and sixty, the military training being much more severe than elsewhere. The A. was composed of hoplites, the cavalry, and sev. regiments of light-armed troops formed principally from mercenaries. During the fourth century B.C. the As. of Greece underwent a very considerable change. Hitherto they had been national As. now they were to become mercenary As. The expedition of the Ten Thousand was the first expedition of a purely mercenary A.; hence the war became a trade, in which only specially trained and paid soldiers took part. The free soldiers of Greece declined more and more, until we find the mercenary element alone represented. It is necessary to notice in connection with Grecian As. the phalanx formation. This was a formation of parallel lines of soldiers drawn up in a dense and practically impenetrable mass. The early phalanx had about six to eight lines of soldiers, the later development—the Macedonian phalanx—consisted of sixteen columns of soldiers armed with Macedonian pikes about 24 ft. long, drawn up in close order. The Macedonian A. of Philip was probably the second standing A. of the world.

In the meantime the Rom. A. had been slowly coming to the front, and with the rise of the Rom. A. we get one of the most perfect forms of military organisation in the world. The Rom., like the Gk., was, as a citizen of the republic, bound to serve the commonwealth as a soldier. All Rom. citizens between the ages of eighteen and forty-six were bound to serve in the A. They received a good military training during their early military career, and for the first few years they served with the 'juniores' or active A., afterwards passing to the reserve ('seniores'), where they continued their service until they reached the age limit. The richer citizens became members of the cavalry, but the greater part of the A. was composed of infantry. During the periods of active service the soldiers received pay. The A. was organised into legions, which in turn were subdivided into centuries and maniples. The sections were commanded by military tribunes, who took their orders from the consul or proprætor. Up to the time of Marius the Rom. A. was recruited purely from the Rom. republic, but during the Marian regime the ranks of the Rom. A. were thrown open to the Italians, and even to peoples unconnected with the Rom. republic. The system of cohorts was also organised by Marius. Such was the citizen Rom. A. up to the time of Augustus. By Augustus the A. was made permanent, and remained stationed on the frontiers of the empire for the purpose of guarding it. In its best days the Rom. A. excelled all others from the point of view of discipline and *esprit de corps*, but gradually the citizen A. changed. The free citizen of Rome no longer regarded it as an honour to form part of the legion, the frontier of the empire was guarded by troops stationed in one particular place and recruited from the inhab. of that country. Barbarians began to assume an important place in the legions, and gradually the power of the Rom. A. passed into the hands of the barbarian mercenaries. Not only had this a grave effect on the A. itself, but it affected very greatly also the policy of the emperors, and in the course of time the Rom. A. made and unmade its own emperors. The Rom. citizen was no longer the finest soldier in the world, but depended on the strength of the mercenaries for the defence of the empire. The decay of the Rom. citizen A. was a potent cause of the ultimate decline of the Rom. empire.

Following the fall of the Great Rom. empire, we have to turn to the As. of the Teutonic tribes. These As. were essentially nations in arms. It was the privilege of the freeman to bear arms. None but a freeman could do so, and only then when he had been pronounced worthy of the honour by the 'clan.' These As. fought independently under the chiefs of their tribes; the war footing lasted only as long as the campaign, then the A. was abandoned and the freemen again returned to their homes and liberty. Families were the basis of society. These families were united together into clans, the clans themselves were divided into hundreds, each of which was supposed to place one hundred warriors in the field. In time of peace each freeman claimed equal liberty; in time of war, a king or chief was elected, whom the freemen followed and obeyed as long as the war lasted. These chieftains were invested with

absolute power as long as the war continued, but this absolute power was given up as soon as peace was declared. From this system of 'clan' warfare to one of feudal warfare was not a far step. Warriors who fought on terms of equality naturally demanded an equal sharing of the conquered territory. The chieftains divided the conquered lands amongst the warriors of the victorious As., and from this beginning we get the gradual rise of the feudal system. The discipline of the 'barbarian' As. was largely obtained from the Rom. A. Prisoners of war and deserters from the Rom. A. afterwards fought in the barbarian ranks, and in this way the discipline of Rome was rudely learnt. The As. were composed of infantry almost entirely, this infantry being divided into a light infantry which fought in conjunction with what cavalry there was, and the heavy infantry which fought in a wedge-shaped formation, and on which fell the greater burden of the fighting.

The system of 'commendation' was common amongst the Ger. tribes; the young men of good birth commended themselves to some chieftain and became his men. They formed his bodyguard in time of peace, the nucleus of his A. in time of war. Gradually this idea spread, and many small landowners commended themselves to the 'lord,' and in return for his protection rendered certain services to him. When territory was conquered the land was divided by the lord amongst his followers, and in the course of time he demanded as a return for these gifts an absolute supremacy over the property and persons of his followers. This was the beginning of the feudal system. Under the early Carolingian kings we have the transition period—the period when the national A., *i.e.* the nation in arms, and the feudal A. work together; but under the greatest of the Carolingians, Charles the Great, we find the full feudal system in force. From this time until the Renaissance the As. of Europe are feudal As., the national A. disappears, and the baronial militia takes its place. Organised gov. and central gov. were practically impossible with such a system, whereby a baron could be more powerful than his nominal overlord. Any organised central authority that there was under some of the greater kings was a purely personal matter, and vanished with their death.

The feudal levy was the gathering together of the lord, his men-at-arms, his other dependents and retainers. The A. was no longer composed of national levies, but was divided roughly into cavalry and infantry, which div. represented a social as well as a military difference. The lord and his men at-arms—cavalry—represented the nobility; the peasant and the serf—the infantry—the poor of the estate. There were many drawbacks in a feudal A.; in the first place, service was restricted, forty days in the year or three months was the longest service which was given, and after that the As. disbanded. Further, no developments took place in military science; true, the barons and the knights improved their armour and their weapons, but always at the expense of the infantry, whom it was policy to keep ill armed and badly equipped. Dependence was placed almost entirely upon the heavy cavalry charge, a charge which swept all before it, until, by a development of tactics, it was shown that it could be met and overthrown by infantry and archers; but too much reliance was placed on it even after it had been shown to be practically useless. In the earlier feudal days there was no organised fighting at all; often battles were decided by single combat, and always a knight simply rode into battle in order to seek glory for himself by deeds of personal valour. A change certainly came with the Crusades; the helpless masses of fanatical pilgrims who made their way to the Holy Land to perish through lack of organisation certainly helped to point the need for an organisation of some kind. The numerous and independent leaders often led to disaster, and so out of this evil came military efficiency, for from this period we can find the beginnings of organised warfare. Following the Crusades came various battles in which new tactics were displayed and which showed fairly obviously that the day of the heavy cavalry charge was over. The battles of Falkirk and Bannockburn were both examples of the new development. But the three great battles of the Hundred Years' War show both the development of the new tactics and the employment of a new kind of A. The combination of missile and shock tactics employed by Edward III. and Henry V. showed that the feudal cavalry of France was effete. The methods of raising an A. adopted by Edward III. showed that the beginning of the end of feudal levies was in sight. Scutage had led to the employment of mercenaries. Edward III. adopted the plan of mercenaries on a large scale; kings could depend on mercenary As., and could by their aid overthrow feudalism. In the same way we get very similar developments on the continent; the towns

ranchised and raise a militia hey are only too pleased to use , their natural enemies, the lords. Again we find that the ion of gunpowder had a great on feudalism, an effect which radual, but which nevertheless e led to the overthrow of feudal r. It was not for a considerable that the making of cannon ed the effective introduction of ery. But when artillery became y effective it ultimately caused a lution in the art of war. Henry ad used artillery before Harfleur, it was not until the end of the nteenth century that we can say illery becomes really effective.

The fall of feudal As. was followed nost immediately by the rise of anding As. The earliest example of standing A. in Europe is the formaon of the famous janissary corps in urkey, which came into existence in 362. For a century this remained he only standing force, but after the Swiss infantry had proved that they were more than a match for the Burgundian cavalry and when Charles VII. had won repeated victories over the English, a standing A. was created in Western Europe. A force of about 9000 men was raised by Charles VII. and divided into *compagnies d'ordonnance*, which were to remain in existence even in times of peace; a few years later a larger force of infantry was raised by the same king. A standing A. gave an overwhelming advantage to the king; and got rid of the necessity of employing mercenaries, who were as much a disadvantage to their employers as they were a check to the enemy. This example was soon followed by other European powers, and the practice of calling out the feudal levy practically ceased from this time. It is not to be doubted but that the employment of a standing A. added largely to the despotism of kings, since no longer need they depend upon the feudal barons, and in addition they had an A. on which they could depend to put down the power of the barons whenever it was necessary. With the beginning of the sixteenth century the new development went on rapidly, and soon practically all troops were armed with firearms. A point which may perhaps be emphasised here is the great power which the possession of artillery gave into the hands of kings; the power of Henry III., for example, depended to a very large extent upon the fact that he possessed the monopoly of artillery in England. The method of raising a standing A. was similar to the method which had already been used by Edward III. The contracts for the raising of the A. were given to the great nobles, and in this way we get the beginning of our regimental system. The noble commanding the regiment was given a certain sum for the raising of it, and was also granted a certain sum every year for the maintenance of his regiment. At first mercenaries were very largely employed, but later the A. became to a very great extent a national and *voluntary* A. The improvement in arms led to improvements in military science, and to the development of the art of war. Under the great commanders Gustavus Adolphus and Wallenstein great changes were brought about, and instead of the *mêlée* of feudal warfare we find an organised system of military tactics which depended very largely upon the organisation of the military units.

The campaigns of Louis XIV. led to the formation of the larger divs. and brigades which form part of the modern As. Under Frederick the Great we have the beginnings of strict military training and discipline which led the Prussian troops to victory time after time when he was able to carry out his own plans, and which lessened very considerably the defeats with which he also met. The training of the Prussian infantry was due very largely to the great generalship of Frederick I., but the introduction of effective methods of shock tactics was due entirely to the great Frederick. The drill books which were used in the training of the Prussian A's. have remained the basis for the training of practically all European As. up to the present time. The Fr. Revolution, however, brought with it a very essential change in the methods of raising an A. The bloody wars from which France emerged victoriously in 1797 had led to a serious draining of her resources. Louis XIV. had proved by his appeal to the Fr. nation after Oudenarde that the Frenchman was essentially a patriot; but now a new system, and a system which was to revolutionise As., was adopted. In 1798 the law of conscription wa brought forward and passed b Jourdan. By this law every citize was bound to serve in the As. France. The whole Fr. pop. betwe the ages of twenty and twenty-five w immediately enrolled, and beca liable to service when called upo the A. of France was once again to the nation in arms. To this gr scheme was due to a very large ext the success of Napoleon. He co raise an A. when he chose; the lo an A. did not essentially inte with his great plans. The Ru disaster was remedied by the ra of an A. equal to the one which

absolute power as long as the war continued, but this absolute power was given up as soon as peace was declared. From this system of 'clan' warfare to one of feudal warfare was not a far step. Warriors who fought on terms of equality naturally demanded an equal sharing of the conquered territory. The chieftains divided the conquered lands amongst the warriors of the victorious As., and from this beginning we get the gradual rise of the feudal system. The discipline of the 'barbarian' As. was largely obtained from the Rom. A. Prisoners of war and deserters from the Rom. A. afterwards fought in the barbarian ranks, and in this way the discipline of Rome was rudely learnt. The As. were composed of infantry almost entirely, this infantry being divided into a light infantry which fought in conjunction with what cavalry there was, and the heavy infantry which fought in a wedge-shaped formation, and on which fell the greater burden of the fighting.

The system of 'commendation' was common amongst the Ger. tribes; the young men of good birth commended themselves to some chieftain and became his men. They formed his bodyguard in time of peace, the nucleus of his A. in time of war. Gradually this idea spread, and many small landowners commended themselves to the 'lord,' and in return for his protection rendered certain services to him. When territory was conquered the land was divided by the lord amongst his followers, and in the course of time he demanded as a return for these gifts an absolute supremacy over the property and persons of his followers. This was the beginning of the feudal system. Under the early Carolingian kings we have the transition period—the period when the national A., *i.e.* the nation in arms, and the feudal A. work together; but under the greatest of the Carolingians, Charles the Great, we find the full feudal system in force. From this time until the Renaissance the As. of Europe are feudal As., the national A. disappears, and the baronial militia takes its place. Organised gov. and central gov. were practically impossible with such a system, whereby a baron could be more powerful than his nominal overlord. Any organised and central authority that there was under some of the greater kings was a purely personal matter, and vanished with their death.

The feudal levy was the gathering together of the lord, his men-at-arms, and his other dependents and retainers. The A. was no longer composed of national levies, but was divided roughly into cavalry and infantry, which div. represented a social as well as a military difference. The lord and his men at-arms—the cavalry—represented the nobility; the peasant and the serf—the infantry—the poor of the estate. There were many drawbacks in a feudal A.; in the first place, service was restricted, forty days in the year to three months was the longest service which was given, and after that the As. disbanded. Further, no developments took place in military science; true, the barons and the knights improved their armour and their weapons, but always at the expense of the infantry, whom it was policy to keep ill armed and badly equipped. Dependence was placed almost entirely upon the heavy cavalry charge, a charge which swept all before it, until, by a development of tactics, it was shown that it could be met and overthrown by infantry and archers; but too much reliance was placed on it even after it had been shown to be practically useless. In the earlier feudal days there was no organised fighting at all; often battles were decided by single combat, and always a knight simply rode into battle in order to seek glory for himself by deeds of personal valour. A change certainly came with the Crusades; the helpless masses of fanatical pilgrims who made their way to the Holy Land to perish through lack of organisation certainly helped to point the need for an organisation of some kind. The numerous and independent leaders often led to disaster, and so out of this evil came military efficiency, for from this period we can find the beginnings of organised warfare. Following the Crusades came various battles in which new tactics were displayed and which showed fairly obviously that the day of the heavy cavalry charge was over. The battles of Falkirk and Bannockburn were both examples of the new development. But the three great battles of the Hundred Years' War show both the development of the new tactics and the employment of a new kind of A. The combination of missile and shock tactics employed by Edward III. and Henry V. showed that the feudal cavalry of France was effete. The methods of raising an A. adopted by Edward III. showed that the beginning of the end of feudal levies was in sight. Scutage had led to the employment of mercenaries. Edward III. adopted the plan of mercenaries on a large scale; kings could depend on mercenary As., and could by their aid overthrow feudalism. In the same way we get very similar developments on the continent; the towns

re enfranchised and raise a militia which they are only too pleased to use against their natural enemies, the feudal lords. Again we find that the invention of gunpowder had a great effect on feudalism, an effect which was gradual, but which nevertheless in time led to the overthrow of feudal power. It was not for a considerable time that the making of cannon allowed the effective introduction of artillery. But when artillery became really effective it ultimately caused a revolution in the art of war. Henry V. had used artillery before Harfleur, but it was not until the end of the eighteenth century that we can say artillery becomes really effective.

The fall of feudal As. was followed almost immediately by the rise of standing As. The earliest example of a standing A. in Europe is the formation of the famous janissary corps in Turkey, which came into existence in 1362. For a century this remained the only standing force, but after the Swiss infantry had proved that they were more than a match for the Burgundian cavalry and when Charles VII. had won repeated victories over the English, a standing A. was created in Western Europe. A force of about 9000 men was raised by Charles VII. and divided into *compagnies d'ordonnance*, which were to remain in existence even in times of peace; a few years later a larger force of infantry was raised by the same king. A standing A. gave an overwhelming advantage to the king; and got rid of the necessity of employing mercenaries, who were as much a disadvantage to their employers as they were a check to the enemy. This example was soon followed by other European powers, and the practice of calling out the feudal levy practically ceased from this time. It is not to be doubted but that the employment of a standing A. added largely to the despotism of kings, since no longer need they depend upon the feudal barons, and in addition they had an A. on which they could depend to put down the power of the barons whenever it was necessary. With the beginning of the sixteenth century the new development went on rapidly, and soon practically all troops were armed with firearms. A point which may perhaps be emphasised here is the great power which the possession of artillery gave into the hands of kings; the power of Henry III., for example, depended to a very large extent upon the fact that he possessed the monopoly of artillery in England. The method of raising a standing A. was similar to the method which had already been used by Edward III. The contracts for the raising of the A. were given to the great nobles, and in this way we get the beginning of our regimental system. The noble commanding the regiment was given a certain sum for the raising of it, and was also granted a certain sum every year for the maintenance of his regiment. At first mercenaries were very largely employed, but later the A. became to a very great extent a national and *voluntary* A. The improvement in arms led to improvements in military science, and to the development of the art of war. Under the great commanders Gustavus Adolphus and Wallenstein great changes were brought about, and instead of the *mêlée* of feudal warfare we find an organised system of military tactics which depended very largely upon the organisation of the military units.

The campaigns of Louis XIV. led to the formation of the larger divs. and brigades which form part of the modern As. Under Frederick the Great we have the beginnings of strict military training and discipline which led the Prussian troops to victory time after time when he was able to carry out his own plans, and which lessened very considerably the defeats with which he also met. The training of the Prussian infantry was due very largely to the great generalship of Frederick I., but the introduction of effective methods of shock tactics was due entirely to the grea Frederick. The drill books which wer used in the training of the Prussia A's. have remained the basis for th training of practically all Europea As. up to the present time. The Revolution, however, brought with a very essential change in the metho of raising an A. The bloody wars fr which France emerged victoriously 1797 had led to a serious draining her resources. Louis XIV. had pro by his appeal to the Fr. nation a Oudenarde that the Frenchman essentially a patriot; but now a system, and a system which wa revolutionise As., was adopted. 1798 the law of conscription brought forward and passed Jourdan. By this law every ci was bound to serve in the A France. The whole Fr. pop. bet the ages of twenty and twenty-fiv immediately enrolled, and be liable to service when called u the A. of France was once again the nation in arms. To this scheme was due to a very large the success of Napoleon. He raise an A. when he chose, the an A. did not essentially in with his great plans. The disaster was remedied by the of an A. equal to the one wh

perished on the road from Moscow, and in this way Napoleon kept the upper hand over all the As. of Europe. It followed, then, quite naturally that if the other nations of Europe were to keep their positions as powers they must adopt a similar plan, and at the present time all the continental powers have conscripted As.; Great Britain alone still maintaining her voluntary A. From the Prussian A. came further developments; As. were raised and trained for a year, being then sent back to their homes as a reserve force, liable to be called upon when necessary. The system proved successful, and with the battle of Sadowa it proved itself so effective that the system of a reserve A. and a short service system was taken up by practically every power. Now every nation has three lines of service, her standing A., her reserve A., and her second line of reserve, a militia, or similar force formed on a territorial basis.

General sketch of the history of the British army.—Three main divs. may be distinguished at the outset in the history of the British A.: the pre-Norman or Anglo-Saxon period, the feudal period, and the period of standing As. The Anglo-Saxon A. was essentially a territorial militia based on the same system as the great Teutonic As., *i.e.* that it was the right of every freeman to bear arms in defence of his country. In England it was called the fyrd, and was not of very great use, since the terms of service were not very clearly defined, and since the fyrd, except under very special conditions, would not fight outside its own territorial div. The fyrd was composed of all thanes, who usually went into battle mounted, and all freemen, who fought on foot and who were variously armed and badly organised. Further, no great development could take place in the ...d system, since its service was re...cted to two months, and since, if ... whole fyrd were called out at one ... the same time, the whole of the ...s of the country would be ruined. ...her, the fyrd, when the immediate ...paign was over, disbanded itself ...went back to the land. The only ...ndable section of the service was ...us-carles, who had been intro... by Canute, and who formed an ...ial part of the A. which fought ...stings. The whole system was ...ed by the Norman Conquest in ... By the end of William I.'s ...he feudal system had practi...een accepted by everybody in ...d. On its military side it ..., England roughly into 60,000 ... fees, the holder of each of ...vas liable to knight's service for forty days in the year. The feud... levy was, theoretically at least, boun... to serve the king anywhere, but i... fact there were many drawbacks to th... system. The feudal period was barely sufficient for the crushing of a smal... revolt, and was ridiculous when applied to a foreign war. Further, many of the feudal levy did not owe full service, and returned home after ten or twenty days. Gradually, because of this, and as a result of the desire of the king to have a dependable A. and to crush the barons, the system of scutage, instituted by Henry I., grew up. Under Henry I. it applied only to spiritual holders of knights' fees, under Henry II. it *might* apply to any one to whom the king granted permission to pay 'shield money' instead of rendering services. With the money thus obtained the king might raise mercenary troops, and so in future the idea of the king is not so much to raise soldiers from the feudal fiefs as money to obtain soldiers.

The establishment of a mercenary A. was obviously the beginning of the establishment of a standing A., but in the meantime grew up another totally different force. The militia, or, as it was originally called, the *posse comitatus*, was the levy of all able-bodied men in the country who were liable to be called out at any time to keep the king's peace. By the Assize of Arms of Henry II., 1184, this system was given some organisation, which was developed by the system of watch and ward of Henry III.'s reign, and by the Statute of Winchester of Edward I., 1285. This statute laid down the duties of each man, duties which largely depended upon the amount of property which he had, and also the number and kind of weapons he was to carry. The militia raised in this way was liable to be called out for military service at home, but not abroad, although it seems to have served from the beginning in very much the same way as the later militia, as a means of recruiting the A.

The system by means of which the Edwards raised their As., and especially the system used in the Hundred Years' War, was a combination of the feudal and mercenary systems. Edward III. and Henry V. both depended entirely upon the resources of England for the men whom they placed in the field, and obtained these men by means of contracts with the great nobles and the captains of free companies, incidentally in this way solving social and economic problems. The captains of each regiment were given contracts, usually for one year, by which they were to maintain and arm their soldiers, and in return were to receive a certain fixed sum. The

money for the soldiers was supplied from various sources, some coming from the royal revenues, some from parl. grants, some from the feudal fines paid in lieu of service. But all As. were disbanded at the end of a campaign, since the king did not then have the money by means of which they could be maintained. During the Tudor period As. were raised in a very similar fashion; under Henry VIII. we get the organisation of the yeomen of the guard and gentlemen-at-arms, these forming to a certain extent the beginning of the standing A. system. At times these 'contract' As. assume the proportions of a standing A., and lead to slight troubles with the parliament, especially during the Irish wars of Queen Elizabeth.

The accession of Charles I. marks a new period, or at least the beginning of a new period. The A. becomes a source of constant trouble between the king and his parliament. The frequent billeting and use of martial law led to the Petition of Right, which Charles accepted without the slightest intention of keeping, and which declared billeting and martial law in times of peace illegal. By accepting the petition Charles practically declared that the king had no right to keep a standing A. in time of peace, a doctrine which was endorsed later in the great Revolution. During the Bishops' War he applied to the parliament for supplies for the maintenance of an A. necessary for the defence of the realm. The question of the command of the forces and garrisons was one of the essential causes of the Civil War, parliament and the king both claiming the right to control the forces. After the Civil War the A. became the most important factor in the politics of the country; the New Model A. may well be regarded as the first British standing A. Cromwell at least realised that it was impossible to fight the Cavaliers, with the whole force of military training and tradition behind them, save with a force that had some equally great object as its motive power. The result of this was the raising first of the 'Ironsides,' later of the New Model A., a regiment and an A. which were founded on the strictest principles and which opposed to the principles of Royalism the principles of Puritanism; in fact an A. which can easily be called 'Puritanism in arms.' At one time Cromwell had a standing A. of about 80,000 men, fanatically enthusiastic as to the principles of the Civil War and masters of the country. For a short time during Cromwell's period of power we find the country ruled by what was practically martial law, but this was no more popular, though it was less openly resented, than it had been during the reign of Charles I. The Restoration naturally led to the disbandment of this force, which could hardly have been expected to have held the confidence of the newly-restored monarch, Charles II.; but with the accession of Charles II. we get the beginning of the real standing A. period. Most of the forces were disbanded, but Monk's foot regiment (Coldstream Guards was kept, and two regiments of life guards were formed from amongst the Cavalier supporters of Charles II. In addition, certain towns and fortresses were garrisoned with permanent garrisons maintained by royal grant. With the acquisition of ter. in Africa and India we get also the formation of permanent regiments for thei garrison and protection. During th reign of Charles II. there were forme at home also a few other regiment chief amongst which may be mer tioned the Royal Scots (Dumbarton Regiment), which had seen continuo service since the ninth century, ar the Buffs, which became part of tl British standing A. about the sar time. After the death of Charles J events moved more rapidly; James raised a standing A. which at c time consisted of 20,000 men, tv thirds of whom were stationed Hounslow Heath in order to ov awe the Londoners. In spite of protests of parliament, to whom had proposed the raising of a la standing A. in lieu of a militia continued to raise men, to use ma law, and to billet his soldiers private persons. With the Rev tion this ceased; James was dr from the country and his A. banded. William II found hi at the beginning of his reign wit Dutch guards and a small pa James' A. as his only standing and the only force with which h to repel the attacks of the James. It was again necessa the defence of the country t standing A. should be created, standing A. was sanctioned by ment, who safeguarded themsel assuming practical control of it the checks which had been pl it by the Bill of Rights. In t year of William III's reign that a Mutiny Act is passed gives the crown power to martial law with all military such as mutiny and desertior same time repeating the safeg the Bill of Rights and denour legality of a standing A. in peace. This Mutiny Act was come of the mutiny at Ipsv regiment which had been

James II., and which mutinied in his favour. William found himself unable to punish them in any way at all, and appealed to parliament; the result was that the Mutiny Act was passed. During the War of the Protestant Succession parliament sanctioned the raising of quite a large standing A., numbering about 60,000 men, but after the Treaty of Ryswick in 1697 the A. was again restored to a peace footing; William's Dutch guards were sent home, and the A. was reduced to 7000 men in England and about 12,000 men in Ireland. The outbreak of the War of the Spanish Succession saw the raising of a large standing A., an A. which reached the dimensions of about 200,000 men, but which was immediately reduced to the proportions of the A. of the Peace of Ryswick after the declaration of peace at Utrecht in 1711. During the century which followed, the strength of the British standing A. fluctuated between 18,000 on a peace footing and 200,000 in the middle of the nineteenth century, and on a war footing from 70,000 to 250,000 between the same dates. During the early wars of the eighteenth century the British A. distinguished itself in many battles, at no time perhaps was it better than during the campaigns of Marlborough. Amongst the war honours won and still borne by British regiments may be mentioned Blenheim, Ramillies, Oudenarde, and Malplaquet under Marlborough, Fontenoy during the War of the Austrian Succession, Minden during the Seven Years' War, and Plassey under Clive. The glorious campaign which won us Canada and lost us Wolfe is amongst those which count to the lory of British arms. But during he American War of Independence he glory and prestige of British arms ank into decay, and during that war ust be recorded the disasters of aratoga and Yorktown. The early orts of the British A. during the volutionary wars were not altoher successful, but the new organiion and training under the Duke of rk did much to increase its efficiy. Victories can after this be orded almost everywhere, in Egypt, ndia, and in Europe. Alexandria won by Abercromby, Assaye by esley, while later on in Europe fought the glorious campaigns of Peninsula and the culminating vorld-shaking victory at Waterwhere the British regiments d that their old prestige and , were still unassailable. Be-Waterloo and the Crimean War did not undergo many changes. attles were fought in India and onies, but the A. rested and supported itself upon the hono which it had won in the Peninsula a at Waterloo. It was a period stagnation and rest, a rest which w to receive a rude shock in the disaste of the Crimean War. This wa opened the eyes of the country to th absolute necessity for A. reform Between the Crimean War and 187 England received many lessons from the continental nations. France fought in Italy in 1859, but the real lessons came from Prussia, who proved the overwhelming value of a well-trained reserve in the Seven Weeks' War. The other nations realised that in order to keep on level terms their As. also must be reorganised, that the art of war must be more carefully studied, and these lessons were emphasised by the Franco-Prussian War of 1870–1. From that time the War Office received special attention from successive war ministers, and from that time dates the beginning of the short service system introduced into the British A. by Mr. Cardwell in 1871, and frequently reorganised since that date.

Army organisation.—The 'arms' of the A. consist of the infantry, the cavalry, and the artillery, each of which 'arms' is able to perform some function or functions which the others cannot. These three main divs. are not the only divs. into arms, since there are others, such as tanks, armoured cars, cyclists, engineers, etc., but they form the main body of the ordinary fighting machine. The relative importance of each of these arms varies in accordance with the conditions under which they are fighting, *e.g.* in flat open country a large number of guns would be necessary, since they are able to command the enemy at a considerable distance; in 'difficult' country infantry would preponderate, since infantry are more easily able to negotiate the difficulties caused by the physical features of the land; while in 'veldt' country, as was exemplified in the Boer War, cavalry would be an absolute necessity. Of the three arms the infantry preponderate, owing to the fact that they are able to fight at a distance or at close quarters, but it must also be borne in mind that the proportion of infantry to cavalry and artillery is much greater on a war footing than on a peace basis, because it is much more easy to raise infantry at least partially trained than cavalry or artillery. The normal proportions of each of these three arms immediately prior to the Great War stood at about 5 guns and 160 cavalry to every 1000 infantry, this being, of course, on a peace footing.

stomary to divide infantry in ments, battalions, and com- avalry into regiments, squad- d troops: and artillery into s which are variously grouped r. A lieutenant-colonel com- a battalion, which is divided our companies, each com- d by a captain. The com- of general officers are the es of infantry, cavalry, and ry, or the div. of more than one ry brigade together with a force illery and cavalry. brigade is the command of a dier or major-general, some- s of a colonel. It usually con- of one arm only. The infantry ade consists of four battalions of ntry and the necessary adminis- ive complements, a total of about 0 combatants. This is rather less n the corresponding divs. in the and Ger. As. A cavalry brigade nsists of two and sometimes three giments, while a brigade of artillery a lieutenant-colonel's command. A div. is a body of troops consisting all arms. It consists roughly of bout 15,000 combatants, and is a eneral's command.

The term A. corps, signifying the organisation of a number of com- batants under one commander, and consisting of divs. of infantry each supplemented by a number of brigades of cavalry and batteries of artillery, was abolished in the British A. in 1906, but restored in the Great War.

An 'A.' This term is applied to any organisation of troops consisting of a number of A. corps or divs. under the command of one commander-in- chief. It was held that roughly no 'A.' should consist of more than 150,000 combatants.

War reserves.—Reserve troops fall into two divs., the regular reserve (including the supplementary or technical reserve), and the auxiliary forces. The regulars are liable to serve at any time; the auxiliary, which are represented in this country by the territorials and the special reserve, are troops which undergo a certain amount of military training, but which are not constantly under arms. These may, under certain conditions, be called upon to swell the ranks of the A. in time of war., and to go abroad on ac- tive service in a national emergency. The reserves of the active regiments rejoin their regiments and form the first line; the second line, composed of men trained but not in constant training, would undertake minor work, and later, when trained under war conditions, would be drafted into the field army.

The Royal Army Service Corps.— This dept. of the A. is a comparative innovation. Not until the Peninsular War does there appear to have been any attempt made to organise that section of the A. which was to supply the fighting forces during its campaigns. Up to this period the supply of the A. in the field had been organised only for the purposes of that particular war, and this organi- sation was composed very largely of civilians. During the Peninsular War there appeared a royal waggon train, which reappeared in 1854 as a land transport corps, and which was again reorganised into a military train. Reappearing under various names between 1856 and 1875, it was finally given the name of A. Service Corps. One transport company accompanies each div. of the A., and each company has four sections, three of which carry the staff baggage, while one assists the medical department.

Court-martial.—A person subject to military law is, on the committal of an offence, taken into military cus- tody. Except in the case of an officer, the case, if trivial, may be taken summarily by the commanding officer. The case must be heard as expeditiously as possible, and evi dence on oath is only necessary in a case in which imprisonment for more than seven days can be given. The accused can, however, demand a dist. court-martial instead of submitting to the summary sentence of the com- manding officer.

A regimental court-martial (abol- ished since the Great War) consisted of a court usually called by the com- manding officer, composed of at least three officers of at least one year's service, and presided over by an officer of at least a captain's rank. The greatest punishment which it could give was forty-two days' deten- tion. A dist. court-martial is con- vened by a general officer, consists of at least three officers, each with not less than two years' service, and can give a sentence not exceeding two years' imprisonment.

A general court-martial is the only court which can try a commissioned officer. It has the power to sentence to death or to penal servitude, pro- viding that the ordinary law of the land authorises such sentences for the various offences. It must consist, in the United Kingdom, India, Malta and Gibraltar, of at least nine officers each of whom has at least three years service, and five of whom hold no less than the rank of captain. In other places at least five officers must be present.

The procedure adopted at court- martial is very similar to that of ordinary courts and was considerably improved as a result of the rec

mendations of the Darling Committee. The prisoner is allowed before trial a copy of the accusation and a summary of the evidence of the witnesses. He is allowed time to prepare his defence, to see his witnesses or legal adviser, and is given facilities for the calling together of his witnesses. He has the right to challenge any officer who is convened to sit on the court-matrial trying him. Further, his own commanding officer, or any officer personally interested in the case, is not allowed to sit in judgment. All the evidence of a court-martial is written out, this naturally causing more delay than occurs in an ordinary trial. At a general court-martial the judge-advocate represents the judge-advocate-general and advises on points of law. The sentence of a court-martial goes by the majority, save in a case when the sentence is death. In such case the sentence must be agreed to by two-thirds of the court. Before the sentence is delivered it must be confirmed by the proper authority: in the case of a dist. court-martial, by a general officer having power to convene a dist. court-martial; and in the case of a general court-martial, if in the United Kingdom, by the king, elsewhere by the general commanding. The proceedings of a general court-martial are always submitted to the judge-advocate-general, who advises as to the legality of the proceedings. The authority having the power to confirm can, however, order either reassembly of the court on some point of irregularity or he can refuse to confirm any part or all of the sentence and commute or change the punishment.

Mutiny Act.—The first Mutiny Act was passed in 1689. Prior to this time the A. had been regarded as personal retainers of the king, and had been governed and disciplined by Articles of War. The passing of the irst Mutiny Act gave the control of he A. into the hands of the parliaent, and incidentally by making he Mutiny Act an annual Act, caused e calling of annual parliaments. lthough in many respects the Mutiny ct superseded the king's Articles of ar, yet throughout the eighteenth ntury the crown was allowed the rogative of issuing articles of war troops outside Great Britain, and few occasions the Mutiny Act was ved to expire. The Mutiny Act of , while still allowing the preroga of the crown, at the same time nited that power by statute that eal prerogative passed entirely he hands of the parliament. The y Act legislated for all serious ry offences; the Articles of War he authority for dealing with such offences. In the nineteenth tury the Act and the articles obviously not harmonising, with result that on the recommenda of a royal commission their p was taken by the Army Discip and Regulation Act, 1879. This A after being in force for two years, in turn superseded by the Army A of 1881. It is to be remarked h that the Army Act was a definite fixed code, yet it superseded Annual Mutiny Act. This Act ha been made annual in order to em phasise the important constitutiona point that 'keeping a standing A. i time of peace is illegal except with the consent of parliament.' In order to keep the constitutional precedent, a section was introduced into the Army Act which reiterated the constitutional point, declared the necessity of a certain standing A., and brought the Army Act into force for one year.

The Army Act is the means by which military punishments are determined. It recites the various offences of which a soldier may be guilty, and prescribes the fitting sentence for such a crime. By it death is presented as the punishment for cowardice and treachery before the enemy, and for a number of other offences in time of war, such as desertion, or sleep while on duty, or leaving a post. Death is further prescribed in peace or war for mutiny, or incitement to mutiny. Offences punishable by varied terms of penal servitude follow also. The sentence of 'cashiering' may be inflicted on an officer who has been guilty of 'scandalous conduct unbecoming the character of an officer and gentleman.' Degradation, and severe reprimand are sentences which may be inflicted upon both officers and non-commissioned officers.

Military law is, however, subordinate to ordinary law in all civil cases. Certain crimes committed in the United Kingdom cannot be tried by court-martial; these include murder, treason and rape. These crimes can only be tried by court-martial outside the United Kingdom, if committed at least 100 m. from a civil court which has the power to try such a case. The practice of marking a soldier with the letter D (for desertion) and B.C. (for bad character) was abolished in 1879, the idea that the marking was done with branding irons being entirely erroneous.

An army in the field.—At the beginning of a campaign it is necessary that the A. which is taking the field should have an adequate base of operations. The Great War made no change in this respect except in degree. In most cases it is necessary to have

...base, and that base to be ...y great value should not be ...emoved from the scene of ...s. This risk was appreciated ...uth African War and in the ...Afghanistan, an inland base ...ssary. In the Great War it be- ...nost anomalous to speak of a ...hese terms; for Boulogne the ...e base of the British Expedi- ... forces was no more than a ...disembarkation linked up with ...nd inland bases for supplies ...were located much nearer the ... The selection of a base must ...fully made, and it is obviously ...antage to secure one on friendly ...ry, since preparations are thus ...ed to be carried out in anticipa- ...f the arrival of troops. In the ...War, France being an ally, this ...ion did not arise, but during ...rimean War it was found neces- ... to secure a base by force, and ...clava was taken for this purpose. ...en the A. moves forward it be- ...es necessary to establish a line of ...munication along which the neces- ...y supplies, transports, etc., can ...ve to the help of the A. in the field. ...ong this line of communication ...ich connects with the base, and ...ich is naturally carefully guarded, ...inforcements may be sent to the A. ... action, and the sick and wounded ...ay be removed to the hospitals at ...he base. The length of this line of ...ommunication varies as the distance ...f the scene of war from the base, and ...s the length differs so does the diffi- ...culty of maintaining and guarding it. This line consists of a series of military stations connected together and with the base by means of roads and railways, sometimes waterways being used, and these military stations naturally are carefully guarded. These principles obtained unaltered in the Great War, except that they were exemplified on a much greater scale. In the presence of a hostile population it becomes necessary to guard every possible pregnable point in the line. The railways have to be carefully guarded, every bridge and point of divergence must be defended by block-houses, and a column of soldiers must be kept to defend the line from the attack of the enemy, and if possible to keep the enemy away. The reserve and newly raised troops are usually kept doing the duty of guarding the lines of communication for some time before they are actually sent to the front. After a short period of training of this description under war conditions they are usually judged fit to be sent to take part with the active A. At certain points in the line lesser bases are constructed, where stores may be accumulated, and where temporary hospitals may be erected. In the Great War, when operations were on a vast scale, an elaborate chain of casualty clearing-stations, field-hospitals, and base hospitals was organised for evacuating and tending a continuous army of wounded. The organisation of the base and of the lines of communication is under the command of the general of communications. It is his duty to see to the security and policing of the line of communication: to despatch and transport to the field all supplies of men, arms, ammunition, and stores; to see to the working of all posts, depôts, hospitals, and rest camps; to see to the protection of all posts and garrisons on the line; to make arrangements with all civil authorities on the line; to keep up communications with the field A. and with the other lines of communication; and to keep the generals-commanding the field troops acquainted with the accommodation in hospitals, the number of men in reserve, and the amount of stores, animals, and food still in readiness on the line. Under him at the base are base commandants, section commandants, and post commandants, the first of whom sees that all is in readiness for facilitating the disembarkation of troops, and the forwarding of supplies along the line; the second superintends the troops under his command in his section, while the third commands the troops at his post and watches and records the movements of troops on either side of his post. Other officers of importance at the base are the military landing officer, who superintends all movements of incoming and outgoing troops at the base, in conjunction with the naval transport officer; the officers who superintend all regimental books and documents, and take charge of all baggage left at the base; and the officer in charge of the record office, who sends home all reports of casualties to the authorities and compiles and superintends all returns and records. Along these lines of communication are despatched from the base such supplies of food, arms, and ammunition as are necessary for the troops at the front. These are forwarded to the magazines which are nearest to the field A., and from these it draws its supplies. The question of a supply of food and transport is naturally of grave importance to the A. in the field, and although a great quantity of food and a good transport supply are derived from the base, the A. also depends upon the country in which it is for immediate supplies. In order to be able to obtain supplies from the immediate neigh-

bourhood easily.
keep, if possib.
with the native
are seldom dem
supplies taken a
ready cash, or payment is promised at the end of the war. Supplies are often concealed from the A. of invasion in a hostile country; it is therefore very m
A. to keep
with the n
troops in daily rations, and in addition each soldier carries an emergency supply. A general transport is kept up along the line of communication between the base and the nearest supply depôt to the A. itself. In a minor war, an A., however, can usually depend upon the supplies of the district to keep it going for about three or four days. With an advancing A. it is always necessary to be extending the line of communication, and to be creating fresh depôts from which the troops may be supplied. Further, it is very necessary that a good postal, telegraphic and wireless service should be maintained, and whereas an already formed line of telegraphic and wireless communication may be used, often it is the duty of the base staff to create and preserve a line of communication. The intelligence dept. plays an important part in the obtaining of information for the A. in the field, but for the keeping up of direct communication by means of posts, telegraphs, heliographs, etc., the base officers are responsible.

During and since the Great War, new weapons and new organisations have given rise to many new problems Of special importance in the training of all arms for modern warfare is the formation of a comprehensive plan of activity in attack, because success in battle depends on the proper co-ordination of all arms, since modern battles are not won by the efficiency of any one weapon, but by the com

and place ordered. But when the work of artillery and machine guns has been adequately planned, it is important for modern commanders in the field to remember that forward troops must still push onward and that a determination to advance is essential to success.

It is commonplace that the principles of war are commonsense, and that, in training, each commander must ask himself how far the action he is taking conforms to correct principles. The security of a force is the first responsibility of its com

pose, protective troops must not, either from want of vigilance or through inadequate patrolling, compromise the safety of the force they are covering. In these days of continued experiment with armoured forces (*i.e.* mixed brigades or formations of infantry with machine guns, armoured cars, tanks and six-wheeled or semi-tracked transport wagons) skill in driving and maintenance of vehicles, ability to secure concealment by day and night, skill in crossing rivers, despatch in assembling after dispersion, and protection at rest are all factors which make for success in modern actions and, in consequence, are exercises in which a modern army must be trained. Co-operation with air units is also essential.

Future developments in the way of armoured fighting vehicles will probably be in the direction of co-operation of light armoured brigades with

may be subdivided into armoured echelon or fighting portions and unarmoured portions for administrative tasks.

Army administration.—This includes the whole of the necessary arrangements for the clothing, feeding, paying, and controlling of the A.; the methods by which an A. is raised.

is in the hands of the king, in reality it is in the hands of the Secretary of State for War, who is responsible to parliament for his actions and for the advice which he gives to the sovereign. He is the head of the War Office, and is assisted by two under-secretaries, a permanent one and a parliamentary one. The parliamentary secretary usually sits in the other House to that in which his chief is. Orders concerning matters regarding the fundamental agreement between the sovereign and his troops are issued by the permanent war secretary in the form of royal warrants, which are incorporated in the monthly A. orders.

Within the twenty years before the Great War much reorganisation took place in the A. After the resignation of the commander-in-chief, the Duke

mbridge, in 1895, that office was dinated to the Secretaryship of for War, which may be said to ontrolled practically by the per- ent officials of the War Office. l 1904 the office of commander- hief still existed, and until that od that officer controlled the tary dept. of the A. The adminis- ion at the War Office was formerly trolled by a number of committees l councils, chief amongst which re the Committee of Imperial fence, the War Office Council, and e Army Board. The financial secre- ry advised as to the expenditure in e A., and supervised generally the hole of the financial administration. 1903 were formed the auxiliary rces advisory boards, on which sat presentatives of the various branches f the militia, yeomanry, and volun- eers. The most sweeping reform at he War Office came as a result of the committee presided over by Lord Esher, which presented its report in 1904, and the bases of this reform re- main virtually unchanged.

On the recommendations of that committee a permanent Committee of Imperial Defence was formed, with the prime minister at its head. This committee was to consider and record all questions of military and naval defence as they affect the whole empire. On it were to sit representatives of the A. and navy at home, of the Indian A., and of the colonies. The work of the committee was to discuss questions of imperial defence, to obtain all the necessary information for the proper carrying out of defence, and to advise on general defence questions. In addition to this committee was formed an A. Council, which consisted of four military and three civil members. The military members were the chief of the general staff, the adjutant-general, the quartermaster-general and the master general of ordnance. Their duties were to supervise special depts. of the A. The civil members were: the Under-Secretary for War, whose work was to supervise all civil business that did not come under the heading of finance and estimates; Financial Secretary for War, who supervised all financial matters; the whole council being under the general control of the Secretary of State for War.

The office of commander-in-chief was abolished, and an inspectorship-general took its place. The inspector-general was to supervise the A. and to report to the council on its condition. The A. corps system was rejected, its place being taken by administrative districts. In 1909 followed Lord Haldane's scheme, by which the volunteer A. was replaced by a territorial one, on the basis of county associations. The militia was superseded by a special reserve which enlisted for six years, thus bringing it about that a regular A. would always be ready for foreign service.

Army List.—An official monthly publication which contains a list of all officers of the British A. on full or half pay, together with all changes which have been gazetted.

Army Corps.—A large div. of the A. composed of all arms, infantry, cavalry, and artillery, under a general officer. The A. corps system was condemned by Lord Fisher's report, but up to that time the A. had been divided into six A. corps. The first three contained only regular troops, the remainder were supplemented by militia and volunteers.

Great Britain (*Changes since the Great War*).—The period 1919–30 was marked by two conflicting processes, contraction and development. The financial stringency which followed the Great War necessitated an economy of personnel and *matériel* wherever possible, and even to a point inimical to national security. The lessons of the War and the march of science, on the other hand, pointed the way to the ever-growing need for technical advance which, in its most striking aspect, has led to the increasing 'mechanisation' of the Army. The result has been that while it has shrunk in numbers, the post-bellum Army has lost nothing in efficiency, and among modern armies has reached the highest point of development. So far as organisation is concerned, however, the Cardwell system of linked battalions has remained unimpaired. The Committee of National Expenditure in 1922 reaffirmed the soundness of this system on the assumption that six divisions were required at home, complete in all arms and services. Actually four divs. are now maintained at home as the nucleus of an Expeditionary Force, but the principle remains in spite of reductions. In selecting two battalions from each of the old four battalion infantry regiments (*e.g* Somerset Light Infantry, Middlesex Regt.) for disbandment, the Arm Council left the Cardwell system in tact in its essential feature.

(1) *Organisation.*—The Cavalry E tablishment was reduced in 1921 by th equivalent of one regiment of Hous hold Cavalry and eight regiments cavalry of the Line by a method amalgamation of regiments. In t infantry, six regiments were disband Dublin Fusiliers, Munster Fusili Connaught Rangers, Leinster Re Royal Irish Regt., and the 2nd B

Inniskilling Fusiliers. This left two Irish regiments, the Royal Irish Fusiliers and Royal Inniskilling Fusiliers, with only one battalion each, and these were accordingly linked to conform to the system. Other disbandments were the Machine Gun Corps, which was formed during the war; the West India Regt. (1926); and, in consequence of the creation of the Irish Free State, the S. Irish Horse and the Cork Militia Royal Garrison Artillery. New technical Corps formed since the War are the Royal Corps of Signals, and the Army Educational Corps.

In 1928 the battalions of Foot Guards and Infantry of the Line at home and in the Colonies were in process of re-organisation to comprise three rifle companies instead of four, a machine-gun company being added in place of the pre-existing machine-gun platoon, and an anti-tank section being included in the headquarter wing of each battalion. Tank Corps battalions are now organised into three companies, each of three sections of five tanks, there being fifty-two tanks in a battalion. The strength of the A., in 1930 was about 150,500 as against 166,500 for 1927, in which year 10,000 were additional, to cover the Shanghai Expedition. In addition, there are in India approximately 59,987, so that the total establishment of the Regular Army averages about 206,000. The net expenditure on the A. for the year 1930–31 was £40,500,000.

(2) *Mechanisation.*—The most striking development in the post-war A. is the process of 'mechanisation.' This does not imply any change in the principles of warfare. The man behind the gun or rifle is still the dominant factor. It means that weapons have become more and more scientifically developed and that mechanical transport has taken the place of the horsed vehicle. Modern tanks (heavy, medium and light), for instance, are very different from the old machines which played so dominating a part in ...e Great War: ...ne 'Hathi'); tractors for artillery ...d semi-track and six-wheeled vehi... ...s for transport are all factors in the ...tamorphosis of the present-day A. ...view of the lessons learned during ... since the War, the number of ...ium and light tanks was increased ...927–28; armoured cars were sup... to cavalry units; and it was ...er decided gradually to provide ...ighting and other mechanised ...es required by all units in the .... Some field brigades of Artil... ...have been mechanised (*i.e.* ...-driven), but experimentation ...fferent kinds of tractors is still being made (1930), and all m... artillery brigades are now me...ised. Consequent on this chang... administrative duties as to th... sign, provision and repair of tran... and technical vehicles as betwee... departments of the Quarterma... General and the Master Genera... the Ordnance were in 1927 re-alloca... so as to throw the sole responsibi... on the latter except as rega... vehicles of the R.A.S.C. This mo...fication of the Esher Committe... fundamental division of functio... among the members of the Arm... Council met with much criticism, bu... the better opinion would seem t... approve the change as consistent wit... the altered circumstances. In th... war organisation at General Headquarters in the field, a fourth principal Staff Officer, designated Deputy Master General of Ordnance, will be added to the Staff of the Commander-in-Chief, with duties co-ordinate with those of the Chief of the General Staff, the Deputy Adjutant-General and the Deputy Quartermaster-General.

(3) *Commissions.*—Commissions in the Regular Army are still normally obtained through the Royal Military Academy and the Royal Military College, but the scale of fees or 'contributions' in the case of a cadet whose father was an officer of any arm of the service or a soldier, an airman or a seaman is now only £20, as against £200 for the son of a private gentleman. Commissions may also be obtained through the commissioned ranks of the Territorial A. and Supplementary Reserve, and through an approved University (home or overseas). Some thirty cadetships annually are awarded to young non-commissioned officers selected primarily for their qualities of leadership.

(4) *Pay and Promotion.*—Pay and retired pay are now twice the pre-war rate. Combatant daily rates are: for 2nd Lieut., 11*s.*; Lieut., 13*s.*; Captain, £1 1*s.*; Major, £1 11*s.* 6*d.*; Lt.-Col., £2 7*s.* 6*d.*, and Colonel £2 15*s.* There are special rates for officers with special qualifications such as R.A.M.C. and Army Dental Corps, ranging from £1 2*s.* for a Lieut. to £3 10*s.* for a Colonel. In all cases there is an increment based on periods of commissioned service. Retired pay: Capt. and subaltern, £300; Major, £450; Lt.-Col., £600; Col., £800; Major-Gen., £1000; Lieut.-Gen., £1200 and General, £1400, the actual figure depending on the combined service and rank elements. Similarly, for 'other ranks' the rates are now materially higher, ranging, in the case of normal rates from 2*s.*

for a private, trooper, or gunner, and 4s. for a corporal to 12s. for a Warrant Officer; and, for tradesmen or technicians, from 2s. for an apprentice, and 3s. 9d. to 5s. for different categories of sapper, or private, up to 13s. and 14s. for a Warrant Officer. Promotion of officers now depends as much on merit as on seniority as a result of the acceptance of the recommendations of the Plumer Committee (1925).

(5) *Reserve Forces.*—The A. Reserve numbers about 95,000 men (1925). In 1924 a Supplementary Reserve was created for the purpose of giving to the A. on mobilisation an adequate number of technicians or 'tradesmen.' Its present strength is 2500 officers and 20,600 other ranks. There is no Militia in the old sense. The designation 'Militia' was revived in 1922 for the Special Reserve, recruiting for which has not begun (1931). In 1922 a Departmental Committee considered the question of reviving the old Militia. Upon their findings the A. Council decided to abandon the resuscitation as unnecessary and uneconomical. The Territorial Force was reconstituted in 1920 as the Territorial A., equipped as a second line to the Regular A. and with acceptance of a foreign service obligation. Its strength is now 6600 officers and 131,000 other ranks, or 1100 officers and 35,000 men below establishment.

(6) *Educational Training.*—Education of the rank and file has made considerable progress. In 1920 the Army Educational Corps was formed to train officers for educational work in the Army. This Corps absorbed the old Corps of A. Schoolmasters. About 3000 first-class certificates (English, Map-Reading, Arithmetic, Geography) are awarded annually, and about 100 special certificates (equivalent to Matriculation). There is also provision at three centres, Hounslow, Chisledon and Aldershot, for vocational training. At these centres a limited number of soldiers in the closing months of their colour service are taught some useful trade. To supply the needs of the A. in respect of skilled craftsmen, some 400 boys, chosen by competitive examination, are given three years' training as apprentices in various schools, the chief of which is at Chepstow, and then drafted into a technical Corps.

(7) *Courts-Martial.*—As a result of the recommendations of the Darling Committee appointed in 1920, regimental Courts-martial were abolished and other salutary reforms made, especially as to the legal qualifications of presiding officers, and giving the accused a reasonable opportunity of knowing beforehand what charge is to be preferred. Another and humane reform was the abolition of Field Punishment No. 1. (*See also* BRITISH ARMY OF THE RHINE, COURT-MARTIAL, TANKS, TRACTORS, TERRITORIAL ARMY.)

Empire Troops since the Great War.—The post-War reorganisation of the available troops of the Empire are, judging by general conditions, based on the idea of a common A. for Imperial Service, governed in War by the A. Act and raised in accordance with British A. establishments, so that each force will fit into a joint Expeditionary force without confusion. The citizen forces of Australia are so planned that five ordinary divs. and two Cavalry divs. can be put into the field. Their present strength is about 55,000 and as a result of the International Conference, held at Washington, 1921, the training of a Citizen Force is confined to youths of 18 to 20. Provision is to be made in time for a Central Training Depôt. Analogous conditions obtain in New Zealand. The total strength of the Canadian forces or Militia is approximately 130,000, divided into a permanent establishment of about 4000 (authorised, 10,000) and non-permanent establishment of 10,000 officers and 120,000 other ranks.

In Kenya Colony there is a newly-formed force based on the King's African Rifles who, in course of time, will be supported by a Territorial Force, which latter provides for compulsory service by British subjects.

In other colonies, *e.g.* in the Straits Settlements, and Bermuda, there are small volunteer forces, most of which have been reorganised since the war.

France.—The cardinal division of the Fr. A. is into Metropolitan—further classified as Active, Reserve, and Territorial—and Colonial. The establishment of the Active Metropolitan A. is approximately 420,000, including the Air Force of 33,000. This allows for thirty-two divs. comprising six mixed native and white, three Algerian, one Tunisian, three Moroccan, and three Colonial A. divs., thirty-nine Heavy Artillery regiments, three Tank brigades and four Aviation brigades.

The Colonial and most of the Moroccan divs. are quartered in France. Enlistment in the Metropolitan A. is compulsory and begins at twenty-one (law of November, 1924), but after twelve months the soldier goes first on furlough for two years and then to the first reserve for 16½ years and to the second reserve for eight years. Prior to 1926

service in the active A. was for [illegible]s change will [illegible]ablishment to [illegible] A. establish. [illegible] 59,000 white [illegible]ion of 10,000 and 1[illegible],000 coloured troops. This gave for 1926 a total establishment for the whole French A. of nearly 735,000. Service in the Colonial A. is on a voluntary basis. Immediately after the Great War, the uniform was changed to horizon blue with kepi, except that the Chasseurs, *i.e.* light infantry, were allowed to retain their dark blue. Recently khaki has been adopted for Colonial and N. African troops, and navy blue for aviators.

Germany.—The Reichswehr or regular mobile A., may not, under the Treaty of Versailles, exceed 100,000. The strength in 1929 was about 4300 officers and 95,000 men. Enlistment, by the terms of the Treaty and under the law of March 23, 1921, is voluntary and for twelve years; but officers must engage for twenty-five years on appointment.

It is difficult to estimate the precise military strength, because there exists a large [illegible] (Einwohnerwehr [illegible] variously compu[illegible] The only mobile force other than the Reichswehr, is the Sicherheitspolizei or Schützpolizei (Security Police) numbering about 90,000, some 50,000 of which are assigned to Prussia. The regular A. comprises seven infantry and three cavalry divs.—infantry 10,800 men, cavalry 6250 men.

Italy.—In addition to the Field A. of ten Territorial A. Corps, comprising 30 Infantry and 2 Cavalry divs., the Ital[illegible] teer Militia [illegible] formed by [illegible] and comprising 121 legions. These legionaries are under similar obligations to those of men in the active A. Service in the permanent active A. is for eighteen months and is compulsory, the soldier then going to the reserve until he completes eight years, the mobile militia for four years, and the territorial militia for a further seven years, or a total service of nineteen years. The establishment of the active A. is now (1930) approximately 16,500 officers and 234,700 other ranks, including the Carabinieri, who are really military police like the German 'Security Police.' The Carabinieri number 60,000, half being assigned for duty as Customs Guards. In Africa Italy has a garrison in Libya of 6000 infantry, including mounted men, and a native force of 4000; together with several quadrons of cavalry, horse and camel, and a number of mountain batteries. In Erythrea there is also a special African Corps, the total N. African force approximating in strength to two divs., while in Italian Somaliland there is another mixed garrison of 3000.

Spain.—The principal change in the last fifteen years in Spain was the [illegible]entral General [illegible] being divided [illegible]districts, each under a 'captain-general.' A law of 1925 provides two years active service and a total active and reserve service [illegible] strengt[illegible] 14,000 [illegible] ranks, [illegible] number [illegible] 90,000, and there are also the Civic Guards recruited, like the Ger. and Fr. military police, from the A., and under military discipline, and the Carabineros who, like the It. Carabinieri, act as Customs Guards. The strength of the former is 21,000 infantry and 5000 cavalry; of the latter, 15,000 infantry and 450 cavalry. There is also a large mixed force of about 80,000 of all arms in Africa.

Russia.—In 1914 the Peace Establishment of the Imperial Russian A. was 1,300,000. In 1927 the Soviet A., including the Air Force, numbered 1,124,000, of which 562,000 are provided by the Regular A. and the rest by First Line Territorials. As in Czarist days, service is compulsory, men being called up at twenty-one, after three years of pre-conscription training. The period of service with the Regular A. is five years—two with the Colours and three on "furlough,"—but in the Air arm a man serves three years with the Colours. In the Territorial A., colour service is for four years with breaks. At the end of the five years of conscript service men go to the Reserve till they reach forty years of age, and, it is said that even after that they are transferred to various local formations. The whole country is highly organised for military purposes, there being ten military districts, subdivided into divisional, regimental and battalion areas under Commissariats, whose function is to register men, animals, and transport. The A. comprises twenty-one corps and three cavalry corps, each corps having three divs. and a gas unit. A div. of infantry comprises 18,500 of all ranks, with of course the usual ancillary complement of gunners, sappers and signal units. In all there are sixty-nine infantry divs., thirty of which are Regular, and the others Territorial, and twelve Cavalry and Cossack Divs. The Air

Force is an arm apart from the Red A., but is administered by the Commissar for War. It contains about ninety squadrons of twelve machines each. Armoured vehicles, including tanks, armoured cars, and armoured trains, are under the direction of the Inspector of Artillery and Armoured Forces. There are but few tanks in the Soviet A. The resources of the country are against any sudden or large development of this particular arm, and indeed militate against any really efficient system of transport, there being, indeed, a very poor mechanical transport system, but some use is being made of the Fordson tractor. Gas warfare is regarded by the Red A. as important, and endeavours are being made to devise new gases and to extend the means of production. There is by W. European standards a lack of suitable officers for commissions, most of them being chosen from the communist adherents.

United States.—The strength of the Regular A. is about 140,000 of all ranks and, under the Act of Congress of June 4, 1920, consists of the Regular A., the Organised Reserves and the National Guard. Colour service in the Regular A. is for one year or three years, at the option of the recruit, and men may re-enlist for a further period of three years. Pay is high, being twenty-one dollars a month for a private and 126 dollars, or approximately 24*s*., a day for a master sergeant. Superficially these rates compare not unfavourably with those obtaining in the British A., but in reality the latter is admittedly the highest paid A. in the world, when due allowance is made for the cost of living in the U.S.A. As in the British A., there are higher rates for specialists. The Organised Reserves consist of an Officers Reserve Corps, whose higher ranks are filled chiefly by ex-officers of the Great War, with a present strength of about 100,000; and an Enlisted Reserve Corps of between 5000 and 6000, whose obligations are comparable to those of the British Class A Reserve. The National Guard or organised Militia is somewhat like the British Territorial A., their purpose being to supplement the Regular A., in and for the duration of an emergency, but only under Constitutional guarantees. Its authorised strength is 435,000, but its actual strength is under 200,000. For details of the Army of the U.S. *see* UNITED STATES—*Army*.

Army-worm, or *Leucania unipunctata*, is the larva of an insect of the order Lepidoptera and family Noctuidæ, which receives its name from its habit of marching in great numbers. It does much damage to American crops. The final stage of its life occurs when it becomes a nocturnal moth.

Arnaud, Angelique de St. Jean (*c.* 1624–84), a nun at Port Royal. She was elected prioress in 1673, and was by her piety and courage an example to all the sisters during the Jansenist persecutions. She was elected abbess in 1678, and retained that position until her death. To her we owe the *Mémoires pour servir à l'histoire de Port Royal* and literary pictures of her two famous aunts.

Arnaud, or Arnauld, Ernoldus (*d. c.* 1156), the abbot of St. Florentin de Bonneval, and a friend of the great St. Bernard. During the greater part of his lifetime he kept up a correspondence with St. Bernard, whose life he afterwards partly wrote.

Arnaud, François-Thomas-Marie de Baculard d' (*c.* 1718–1805), Parisian writer and dramatist. He was *b.* in Paris, where he also *d.* For some time his literary merit attracted the attention of Voltaire, by whom he was recommended to the King of Prussia. For some time he lived at the court in Berlin, but returned to Paris the year before the outbreak of the Seven Years' War (1755). During the latter part of his life he lived a life of great poverty and misery. His chief works are *Les Délassements de l'Homme Sensible, Les Loisirs Utiles*, and a number of romances and sacred odes.

Arnaud, Henri (1641–1721), pastor and general of the Vaudois of Piedmont, was *b.* at Embrun. He was educated at La Tour, and later at the college at Basel and the academy at Geneva. He was in the course of time appointed pastor at the vil. of La Tour. After the expulsion of the Vaudois by Victor Amadeus he became their leader, and probably visited William of Orange in order to obtain help and money. The revolution of 1688 in England gave A. encouragement, and he led the expedition which was to attempt 'La Glorieuse Rentrée.' After encountering almost unsurpassable difficulties, they were besieged during the whole winter by the Fr. and the Savoyards; but they were forced to retreat and were driven to a valley above La Tour by A. In the following month they were received into favour by the Duke of Savoy, who had become an ally of William III. For the next few years A. and the Vaudois helped the allies to fight the Fr. But at the end of the war, the duke again becoming hostile, they were forced to leave the country, and about 3000 of them followed A. into exile in Protestant countries, mainly in Germany. Again

the Vaudois, during the War of the Spanish Succession, helped the allies against the Fr., but A. did not fight in person this time. He visited England about 1707. He died at Schönenberg. During his exile he wrote his *Histoire de la Glorieuse Rentrée des Vaudois dans leurs Vallées*, which was trans. into English in 1827.

Arnaud de Cervole (*d.* 1366), a brigand chief who commanded one of those bands which ravaged the S. of France during the thirteenth and fourteenth centuries. He fought with King John at Poitiers in 1356, and with him was taken prisoner. After his release he again returned to the S. of France and exerted his old influence over his band. He pillaged the whole of S. France, and held Pope Innocent VI. to ransom. He again took service with the royal army, and defended Burgundy against the Free Companies; but at the same time he gave it up to his own soldiers to pillage. He was assassinated by one of his own followers.

Arnaud de l'Ariége (1819–78), politician and political writer. He was *b.* at Saint Giron. He became a prominent politician as a Catholic and democrat in 1848. He was elected mayor of one of the municipalities of Paris after the revolution of Sept. 1870. In 1876 he became a senator. He was throughout the whole of his life known as a staunch republican. His chief work was the *Revolution of 1869.*

Arnaud de Verdale, a Fr. bishop of the fourteenth century who fought against the heresies of the Albigensians. He was noted for his austerity and for the rigidity of the discipline which he tried to introduce into his diocese. He wrote also a history of the bishops of his diocese from 800 to 1339.

Arnauld, Antoine (1612–94), the twentieth and youngest son of Antoine A., a famous Fr. lawyer. He is usually distinguished by the name 'le grand A.' He was originally intended for the bar, but chose rather the study of theology. He became a Jansenist, and his book, *De la Fréquente Communion*, raised such an uproar that he was forced into hiding. For more than twenty years he remained outside Paris, but during the whole of this time he added to his Jansenist publications. His letters, *A un Duc et Pair*, a very outspoken attack on Jesuitical methods, were the immediate cause of the famous Provincial letters of Pascal, but these failed to save A. from being solemnly expelled from the Sorbonne and degraded, 1656. The 'Peace' of Clement IX. put an end for the time being to the persecutions of the Jansenists, and A. again emerged from retirement, and was presented and graciously received by Louis XIV. He was a true Catholic, and in his *La Perpetuité de la Foi* defended transubstantiation and attacked the Calvinistic doctrines as subversions of the moral teachings of Christ. Ten years later another persecution drove him again into exile, and he went to [illegible] ed at [illegible] years [illegible] ner of [illegible] (Port Royal Logic) remained as a text-book until quite recent times. As a writer he was too controversial to be of great interest to posterity and his writings also suffered from the fact that his close reasoning caused his books to be too prolific to be attractive.

Arnauld, Marie Angélique (1591–1661), abbess and reformer of Port Royal. Port Royal was a convent of Cistercian nuns in the neighbourhood of Versailles. She was given the abbess' chair at the early age of eighteen years. She quickly began to attempt the reform of the convent, at first on the lines of the original rule, but later, coming under Jansenist influence, on Jansenist lines. For some time she [illegible] returned in 1636, [illegible] until her death. [illegible] persecutions of the Jansenists had begun.

Arnault, Antoine Vincent (1766–1834), was *b.* in Paris. Almost immediately after starting his dramatic writings he was successful with his play *Marius à Mintudnes*, 1791. He left France during the Terror, but returned and was arrested, and for a short time imprisoned. He was patronised by Napoleon and remained faithful to him during the Hundred Days. Because of this he remained in exile until 1819. Ten years later he was again elected to the Academy, and in 1833 became secre- [illegible] orks may be [illegible] *Montcassin,* [illegible] *d'un Sexagénaire.*

Arnaut, a Turkish and Serbian word meaning a native of Albania; an Albanian.

Arnaut Daniel, one of the most famous of troubadours. His name remains to us as the name of the greatest of troubadours, owing to the praise bestowed upon him by Dante. He seems to have been a knight of Perigord, who attached himself as a troubadour to the court of King Richard I. of England. He was a great composer of the love song, and both Dante and Petrarch are loud in their praises of the finished skill of the perfect workman. Lack of historical allusions probably make

A. D.'s poems of not very great general interest.

Arnaut de Mareuil, a troubadour of the S.W. of France who settled at the court of Toulouse. By his passion for the Countess Adalasia he roused the wrath of his rival Alfonso II. of Aragon and was forced to flee into exile. He probably died before the end of the twelfth century.

Arndt, Ernst Moritz (1769–1860), Ger. poet and patriot. He was the son of an emancipated serf, and was educated at Stralsund, Greifswald, and Jena. Intended for the ministry, he renounced it, and led for some time a wandering life. In 1803 he pub. *Versuch einer Geschichte der Leibeigenschaft in Pommern und Rügen*, a history of serfdom which led to its abolition in 1806 in Pomerania. In 1806 he issued the famous call to the Gers. to throw off the yoke of France, and such excitement did it produce that he was forced into exile in Sweden to escape Napoleon. In 1810 he issued pamphlet after pamphlet full of hatred of the Fr., and issued also his famous songs, *Was ist des Deutschen Vaterland?* and *Was blasen die Trompeten?* In 1818 he was appointed to the university at Bonn, and threw himself into the movement for constitutional reform. He was arrested and imprisoned for a short time because of the boldness of his demands, and was not reinstated as professor until 1840. He was elected to the Ger. Diet in 1848, but resigned in 1849.

Arndt, John (Johann) (1555–1621), a Lutheran divine, *b.* at Ballenstedt in Anhalt. He studied theology under the tutelage of Lutheran teachers. His most famous work is his *Wahres Christenthum* (True Christianity). In this he points out Christ's life in his people as contrasted with the main Lutheran doctrine, his death for his people. His works are mainly of the mystical and devotional kind.

Arne, Thomas Augustine (1710–78), the son of an upholsterer, was *b.* in London, and educated at Eton. He was intended for the bar, but his love for music decided his career. In 1733 he produced his first opera, *Rosamond*, in which his sister Susanna Maria, afterwards the famous Mrs. Cibber, took the prin. part. He wrote music for Fielding's *Tom Thumb*, Congreve's *Judgment of Paris*, Milton's *Comus*, and Thomson and Mallet's *Masque of Alfred*. In the latter appeared the famous *Rule Britannia*. In 1744 he was appointed composer to the Drury Lane theatre. In 1746 he composed the music for *Where the Bee Sucks*, and for songs in the *Tempest*. He composed two oratorios, *Abel* and *Judith*. He was made a Mus. Doc. in 1759. He afterwards became famous as a music teacher. He was buried at St. Paul's, Covent Garden.

Arnee, native name of the *Bos bubalus*, or *Bubalus arni*, a buffalo found in the W. Indies. It has large horns and is of great size.

Arneth, Alfred (1819–97), an Austrian historian, was *b.* at Vienna. He was the son of a well-known Austrian archæologist, Joseph von A. A. A. was educated for the law, and later became the keeper of the Austrian state archives. The facilities which he enjoyed in this position give an added authority to his works. He was a member of the Lower House of the Austrian diet, and later was elected to the Upper House of Reichsrath. In 1896 he was chairman of the Historical Commission held at Munich.

Arngrim, Arngrimur Jonsson (1568–1648), Icelandic scholar, surnamed 'the Learned.' The priest of Mel. He wrote *Brevis Commentarius de Islandia*, 1593; a *Supplementum*, on the lives of the kings, 1596; the *Crymogæa*, 1610; and *Specimen Islandiæ*, 1643. *See* Vigfusson and Powell's *Corpus Poeticum Boreale*, 1883.

Arnhem, cap. of the prov. of Gelderland, Holland. Situated on the r. b. of the Rhine about 35 m. E.S.E. of Utrecht. Its surroundings are extremely beautiful. Its chief manufs. are cotton and woollen goods, soap, carriages, and tobacco. Sir P. Sidney died here in 1586. Pop. 75,500.

Arnhem Land, the name given to a portion of the extreme N. of Southern Australia; taken from the name of the ship on which the voyage of discovery to this land was undertaken in 1618.

Arni, *see* ARNEE.

Arnica, a genus of Compositæ found in cold and temperate climates. *A. montana*, the leopard's-bane, common to Alpine woods, contains an acrid resin and a volatile oil.

Arnim, Bettina von (1785–1859), a Ger. authoress, the sister of Clemens Brentano. In 1807 she made the acquaintance of the poet Goethe, for whom she had such a great attachment. The feeling, however, was not reciprocated, and came to an abrupt end in 1811, owing to her deliberate insolence to Goethe's wife. She married in 1811 the writer Ludwig von A. (*q.v.*). Her most famous publication was the *Goethe's Briefwechsel mit einem Kinde*, 1835. This purported to be a correspondence between herself and the poet, which was at first believed to be authentic, but was later proved to be grossly exaggerated, though based on real letters. A number of her books are equally unreliable.

Arnim, Mary Annette, Countess von (now Countess Russell), authoress, a daughter of H. Herron Beauchamp. She married Count August von A., who *d.* in 1910. She won popularity among the better class of readers with *Elizabeth and her German Garden.* Her other works include *The Benefactress, The Caravaners, Priscilla Runs Away, The Adventures of Elizabeth in Rügen, The Pastor's Wife, Christopher and Columbus* (a war-time story), and *Expiation*; all of them show an acute and lively wit. In those of her works that belong to the 'Elizabeth' series, as well as in others, a frequent theme is the reaction of Ger. and English temperaments upon each other; and in *Christopher and Columbus* she proved herself equally at home with Americans in their own land. She became third wife of the 2nd Earl Russell in 1916.

Arnim, Harry Karl von (1824–81), *b.* in Pomerania, and brought up by his uncle, Heinrich von A., who had been ambas. at Paris and foreign minister. He entered diplomatic circles, and in 1864 was appointed Prussian envoy at the Vatican. In 1869 he pointed out the difficulties which would arise practically if papal infallibility were allowed to be promulgated. In 1871 he was Ger. commissioner at Paris, and in 1872 he was appointed ambas. He quarrelled with Bismarck, and on a charge of embezzling state papers was sentenced to three months', and, on appeal, nine months' imprisonment. For a publication against Bismarck in exile, he was sentenced to five years' imprisonment. He *d.* while on his return from exile.

Arnim, or Arnheim, Johann Georg (1581–1641), Ger. diplomatist and general, *b.* at Boitzenburg; served under Gustavus Adolphus in 1613, and in the Polish army, and in 1626 entered the imperial service under Wallenstein. In 1630 he left it for that of the Elector of Saxony, and commanded part of his army at Breitenfeld in 1631, and occupied Prague later in that year. He assisted in the negotiations between the elector and Wallenstein during 1633–4; lefeated the Imperialists under Colloredo at Liegnitz, 1634; and eft the Saxon service at the peace of 635. In 1637 he was arrested by the wedes and imprisoned at Stockholm, ut escaped in 1638. Died at Dresden hile leading the Imperial and Saxon rces against the Fr. and Swedes.

Arnim, Ludwig von (1781–1831), a er. poet and novelist who was *b.* at erlin. He received a scientific train, but his natural tendency was vards literature. His earliest work was *Hollins Liebeleben*, and greatest *Des Knaben Wunderho* which was pub. in 3 vols. in collabotion with the poet Clemens Brentan 1806–8. This latter work was result of his love for the folk-songs Germany, and of the influence Goethe and Herder. *Die Kronewächter*, which remained unfinishe gave great promise.

Arnim, General Sixt von 1851–193 Ger. General. In the final Ger offensive, begun March, 1918, h commanded that one of the seven armies which occupied the line from the sea to the R. Lys. His objective was, in conjunction with General von Quast, commanding from the Lys to Arras, to thrust back the British First Army under General Horne upon the British Armies which were in retreat to the Ancre and so isolate the 2nd Army under General (now Field-Marshal) Plumer. He took Mont Kemmel (April 24–26) by violent frontal and flank assaults, but his losses were so severe that he was unable to secure other hills belonging to the same system, and so could no longer jeopardise Ypres. This failure, together with that at Hazebrouck, was the beginning of the end of the great Ger. thrust of 1918.

Arno, one of the most important rivs. in Italy. It rises on Mt. Falterona in the Apennines, about 25 m. N. of Arezzo. It is about 140 m. long, and enters the Mediterranean at Leghorn, a few miles S. of the tn. of Pisa. It flows through Florence, where it attains a width of about 400 ft. It is navigable for barges as far as Florence, except in the summer, when it is fordable. It is joined to the Tiber by the Chiana canal.

Arnobius (*d.* 327), a teacher of rhetoric in Numidia who flourished during the late third and early fourth centuries. He was brought up as a pagan, but became a Christian, probably about the year 300. In the first decade of the fourth century he pub. the work *Adversus nationes*, for which he is chiefly remembered. The work was a bitter and ironic attack on paganism.

Arnold, tn. and par. of Nottinghamshire, England, 4 m. N.E. of Nottingham, in Sherwood Forest. Has manufs. of lace and hosiery. Pop. 11,800.

Arnold da Brescia was a native of the tn. of Brescia, and one of the most prominent opponents of the temporal power of the papacy. He was born probably towards the end of the eleventh century, of noble parents. Educated in Paris, it is probable that he came into contact with Abélard, even though he may not actually have been taught by him. On his

master, and during the mutiny was able to render signal service to the gov. Later he became a journalist, and was on the staff of the *Daily Telegraph*, and it was he who was largely responsible for the despatch of Stanley to the Congo. He is, however, best remembered as a poet. His most famous poem is *The Light of Asia*, an epic poem on the life and ... st his ... 1875; ... *Sa'di in the Garden*, 1888; *Adzuma*, 1893. He was made a C.S.I. in 1877, and K.C.I.E. in 1888.

Arnold, Hans (1850–1927), pseudonym of Babeth von Bülow, a Ger. authoress, *b.* at Warmbrunn. Her stories of domestic and everyday life have been pub. under the title of *Novellen.*

Arnold, Jonas (*d. c.* 1669), a Ger. painter of the seventeenth century. He was *b.* at Ulm, and has left as one of his most famous pictures a view of the cathedral at Ulm. He was also noted as a portrait-painter.

Arnold, Matthew (1822–88), *b.* at Laleham, Middlesex, on Christmas ... his education. From here, having



MATTHEW ARNOLD

obtained a scholarship at Balliol, he went on to Oxford in 1840. Even at this early time his mind had already turned to literature, and his poem, *Alaric at Rome*, had been recited in Rugby School in 1840. In 1843 he obtained the Newdigate prize with a poem on Cromwell, but *Cromwell* does not give one as good an impression as his earlier poem on Alaric. In the following year he took his degree, and a year later was rewarded with a fellowship at Oriel College. After leaving the university A. for a short time taught classics to the fifth form at his father's old school, but he did not long remain a schoolmaster. In 1847 he became private secretary to Lord Lansdowne, then a leader of the moderate Whigs, and on him A., to a large extent, modelled his politics.

In July 1849 appeared the first of A.'s pub. sonnets, and in the same year appeared the *Strayed Reveller and other Poems*, by 'A.' The publication attracted but little attention, so little, in fact, that the ed. was withdrawn very hastily. This collection of poems, although it contained a number of poems of little merit, at the same time contained much that was very meritorious and that has gained for itself a permanent place in Eng. literature. In 1852 appeared his *Empedocles on Etna and other Poems*, again by 'A.,' but this also was quickly withdrawn, to be followed, however, in the next year by a collection of poems, many of which had been already pub., together with an essay which embodied A.'s idea of poetry. A year before the publication of *Empedocles on Etna*, A. had been appointed by Lord Lansdowne to an inspectorship of schools, and he did an immense amount of good to education in England by the work which he performed as an inspector. His official reports were both interesting and instructive, and his reports on the various foreign tours of inspection which he undertook did a great work. His report on Ger. schools he himself considered most important, since he repub. it twice. He had a great admiration for the Teutonic education. He himself remarked that the Fr. university lacked liberty, the Eng. science, but the Ger. neither. Many of his advocated reforms were carried out both in schools and universities.

In 1857 A. had been appointed to the chair of poetry at Oxford, and he retained this chair for ten years, being the first layman to occupy it. Amongst the new poems which were pub. in 1867 we find his greatest poem, *Thyrsis*, a monody on his dead friend, Arthur Clough. He had ceased to be professor of poetry, but he still occupied a place as a poet second to none, save perhaps Tennyson. By his half-philosophical, half-theological books A. attracted much attention, and he struck the keynote of his philosophy in preach

...ng his favourite doctrine of 'sweetness and light.' His application of literary methods of criticism to the Bible aroused great interest in the country, and he argued that much that was wrong in the theology of the time rested solely on the fact that the Bible was read as a scientific work, whereas his own conception of it was that it was literary, and therefore the methods of literary criticism could be applied to it. *Literature and Dogma* (1873) marks the breaking away entirely of A. from Christian doctrines. His methods of criticism were not always fair, nor always in good taste, but his own criticism roused so much bitter feeling that the methods adopted by both sides contain much that cannot be commended. In 1883 he received a pension of £250 per annum, and in the same year he lectured in the U.S.A. He *d.* at Liverpool of heart failure, occasioned by his having imprudently vaulted over a fence. He was buried at Laleham. Amongst his works are included his poem on Alaric at Rugby, 1840, and his Newdigate prize poem on Cromwell, 1843; *The Strayed Reveller and other Poems*, 1849; *Empedocles on Etna*, 1852; *Poems*, 1853; *Essays in Criticism*, 1865; *New Poems*, 1867; *Lectures on the Study of Celtic Literature*, 1867; *Culture and Anarchy*, 1869; *Literature and Dogma*, 1873; *Irish Essays*, 1882; *Discourses on America*, 1885. His letters were pub. in 1895, and books on him appeared in 1899 (Saintsbury), 1902 (H. W. Paul), and 1904 (G. W. E. Russell).

Arnold, Richard (*d. c.* 1521), an Eng. merchant who flourished during the latter part of the fifteenth century. He also wrote a chronicle which gives a very curious reflection on the ... of the times. His chronicle was pub. at the beginning of the sixteenth century.

Arnold, Samuel (1740–1802), a celebrated Eng. musician. He was employed by the musical directors of Covent Garden, for whom he wrote ...y operas. His first opera was the *...d of the Mill*, which was produced ...765. In 1769 he leased Marylebone Gardens, where he produced ... operas. In 1778 he was given ...degree of Mus. Doc. by Oxford University. He became organist to ...yal chapels ten years later, and afterwards appointed to the ...position in Westminster Abbey. ...st his works may be mentioned the *Battle of Hexham* and the ... *of Calais*.

...ld, Samuel-Benoit (1744–1817), ...s Ger. artist who lived during ...nteenth and early nineteenth ...s. He occupied for some time the position of court paint... the court of Saxony.

Arnold, Samuel Greene (1821... American lawyer and historian, ... Providence, Rhode Is.; graduate... Brown and Harvard universit...; admitted to bar, 1845. He ... lieutenant-governor of Rhode Is. 1852, 1861, and 1862; and a Uni... States senator, 1862–3. Author ... *History of Rhode Island*, 1859; *T... Spirit of Rhode Island History*, 185...

Arnold, Thomas (1795–1842), hea... master of Rugby, *b.* at W. Cow... His early education was receive... at Warminster, but in 1807 h... passed on to Winchester, where h... remained until he entered the University of Oxford in 1811. He entered at Corpus Christi College, but four years later was elected a fellow of Oriel College, where he remained until 1819. His dread of insincerity led him to hesitate deeply before he took orders, but once his doubt of his own realisation of the Christian faith had passed, he became a devout and passionate Christian. After leaving the university he settled down at Laleham, near Staines; here he took pupils for preparation for the university, and also devoted himself to study and to the commencement of his *History of Rome*. Shortly after his arrival at Laleham he married Mary Penrose, the daughter of a Nottinghamshire rector. After nine years' stay, he was appointed to the headmastership of Rugby school, 1828, and here he proceeded to do what had been prophesied of him, 'that he would change the face of education all through the public schools of England.' Schools were no longer to be mere places where the classics and a certain amount of general knowledge was learnt, but a place in which the intellectual and the moral life were harmoniously blended, a training place for Christian gentlemen. He found time to continue his studies amidst his school work, and he did a great amount of literary work. In 1841 he was appointed regius professor of modern history at Oxford, where, during 1841–2, he delivered eight lectures. In 1842, while preparing to spend the long vacation at his house at Fox How in Westmorland, he was seized with an attack of angina pectoris and *d.* June 1. He pub. many vols. of sermons, an ed. of *Thucydides*, and a *History of Rome to the Second Punic War* in 3 vols.

Arnold, Thomas (1823–1900), second son of Dr. A. of Rugby. He was educated first privately by Herbert Hill, a cousin of Southey, and afterwards passed through Winchester to Rugby. Abortive attempts at estab-

lishing in turn a farm and a school made the offer of a position as inspector of schools eagerly accepted. In 1856 he sought refuge from religious doubtings by joining the Roman Catholic Church. Newman offered him a professorship of Eng. literature at the Catholic University at Dublin. Here he compiled his *Manual of English Literature*. His broadening views led to a rupture between him and the Catholic Church, which, however, he rejoined. His works include *Passages in a Wandering Life* and many valuable eds. of the Eng. classics.

Arnold, Thomas Kerchever (1800–53), a prolific writer of educational and theological works. He was educated at Trinity College, Cambridge. He was a determined opponent of the Oxford Movement. He earned a wide reputation for his large publication of school books. His first scholastic work was *The Essentials of Greek Accidence*, which immediately succeeded. His first theological treatise was *The Faith of Abel*. The quality of his work has suffered through its voluminous character; but among modern teachers of prominent position his Lat. and Gk. compositions are still valued highly, particularly for their perfection of style.

Arnold-Forster, Hugh Oakeley (1855–1909), grandson of Dr. Arnold of Rugby, a politician and authority on army and navy questions. He was educated at Rugby, afterwards passing to University College, Oxford. After gaining recognition as the possessor of a marked talent for history, he came to London, where he studied for the Bar. Before he achieved any success, however, he became interested in politics, especially those dealing with Irish questions. He pub. *The Truth about the Land League* shortly after his advent into the political arena. His political ideas, in the beginning of Liberal tendencies, changed to a sympathy with the Unionist cause. In 1885 he married Mary Story-Maskelyne, the daughter of an M.P. His publication of a *Citizen Reader*, a manual of information on the rights of citizenship, for children followed. Later he undertook an adaptation of André's Atlas, and issued it as an Eng. publication. About 1884 his energies, directed against certain army conditions, led to an adoption of improved organisation. In 1900 he was made parliamentary secretary to the Admiralty, which office he distinguished himself by his remarkable knowledge. Under the premiership of Mr. Balfour he was offered the position of Secretary for War. His determination to advance a special scheme of army organisation for the purposes of efficiency in the event of su[illegible] invasion led to an estrangem[illegible] between himself and the cabinet[illegible] failure, owing to the consequ[illegible] ruption, resulted. In 1908 [illegible] *The Army in 1906*, which de[illegible] his own scheme while it ad[illegible] criticised that of his successo[illegible] Haldane. At this time his healt[illegible] way, and further active politic[illegible] terest was rendered out of the [illegible] tion. In the winter of 1906–7 he [illegible] on a voyage to the West Indies fo[illegible] joint reasons of bettering his h[illegible] and in order to enable him to at[illegible] sittings of an agricultural confere[illegible] While at Kingston he experienced [illegible] notorious earthquake, and inc[illegible] only escaped in a miraculous mann[illegible] Staying later at Trinidad, he cau[illegible] a malarial fever, which hastened t[illegible] effect of his previous illness. [illegible] March 12 he died. The tariff refor[illegible] movement had in him one of its ear[illegible] advocates.

Arnoldus de Villa Nova, also calle[illegible] Arnaud de Villeneuve (*d. c.* 1313), wa[illegible] probably of Spanish origin, and wa[illegible] famous as an alchemist, astrologer, and physician. He lived during the thirteenth and fourteenth centuries, and appears to have studied chemistry, medicine, and Arabian philosophy. After living at the court at Aragon, he is believed to have lived for some time in Paris. He was forced into exile in Sicily owing to the hostility of the Church towards him. On the illness of Clement V. he was summoned to attend him at Avignon, but *d.* on the way. Amongst the writings attributed to him on somewhat small authority are *Rasarius Philosophorum*, *Novum Lumen*, *Flos Florum*, and the *Breviarum Practicæ*.

Arnot, Hugo (1749–86), Scottish historian and advocate, *b.* at Leith. His original name of Pollock was changed when he inherited his mother's estates of Balcormo. He was unsuccessful as a lawyer owing to his temper, but was a keen municipal politician, and wrote *History of Edinburgh*, 1779, and *Collection of Celebrated Criminal Trials in Scotland*, 1785.

Arnot, William (1806–75), was *b.* at Sconce and studied at Glasgow. He was a popular preacher and author; was minister at Glasgow from 1839 till 1843, when he left the Established Church at the Disruption. He was then minister of the Free Church at Glasgow till 1863, when he went to Edinburgh, where he *d.*

Arnott, Archibald (1771–1855), a Scottish physician, was *b.* at Dumfries. He was military doctor at St. Helena, and there gained the friendship of Napoleon and assisted at his last moments. He pub. a volume of memoirs of Napoleon.

Arnott, Neil (1788–1874), *b.* at Arbroath, and after having graduated M.A. at Aberdeen, he studied medicine, and was appointed surgeon to the East India Company. He began to practise in London in 1811, and attained eminence as a physician and physicist, being appointed extraordinary physician to the queen in 1837.

Arnotto, or Arnatto, *see* ANNOTTO.

Arnould, Arthur (1833–95), a Fr. journalist, was *b.* at Dieuze. He founded the *Journal du Peuple,* and was condemned to deportation for contumacy, but returned after the amnesty. He later took great interest in theosophy. He died at Paris.

Arnould, Sophie (1744–1802), Fr. operatic singer, *b.* in Paris; entered Grand Opera, 1757; the most prominent singer at the Royal Opera, Paris, till 1778. Among her chief parts were that of Iphigenia in Gluck's *Iphigenia in Aulis,* Eurydice in Gluck's opera of that name, and the principal rôles in Rameau's works. She was famous for her wit and conversational powers, and was the friend of D'Alembert, Helvetius, Diderot, and Rousseau. *See* collection of her *bons mots* in *Arnouldia,* 1813, and her *Life* by Goncourt, 1857.

Arnould-Plessy, Jeanne Sylvanie (1813–97), a Fr. actress, was *b.* at Metz. She married Auguste Arnould, Fr. man of letters. After acting at Paris, she forfeited her rights as a member of the French Theatrical Society by going to act at St. Petersburg, but she afterwards returned to the Théâtre Français in 1855. She created a large number of rôles, but excelled in the part of a coquette.

Arnprior, tn. of Renfrew co., Ontario, Canada, on Chats Lake, 38 m. of Ottawa. In the neighbourhood marble quarries and iron mines, the tn. contains large lumber s. Pop. 4077.

rnsberg is a tn. on the Ruhr, in Prussian prov. of Westphalia, . E. of Hagen. It was the seat of anct. Vehmgerichte, and is the of the gov. of A. Pop. 12,000.

nstadt is a tn. in the Ger. princi- of Schwarzburg-Sondershausen, S. of Erfurt, on the Gera. An huringian city, it has manufs. of r, and a trade in corn and r. Pop. 20,500.

swalde is a tn. in Prussia, in ov. of Brandenburg, 41 m. S.E. ttin, situated between three It has manufs. of iron, ery, matches, and woollens. ,200.

(1629–92) a great theologian venteenth century. He was *b.* ncourt. He was appointed r of theology and meta- at Padua, where he *d.*

Arnus was the name of a famo Gk. priest killed at Naupactu Apollo in revenge struck the Dorian with a plague, and was appeased onl with funeral games instituted i honour of Arnus.

Aroa is the name of a dist. o Venezuela, N.N.E. of the Sierra A. and near the stream of the same name. It contains copper.

Aroer is the name of two O.T. places. The first was situated in Palestine (tribe of Gad), near a trib. of the Jaboc. It was opposite Rabba of the Ammonites, and Jephthah fought the latter near A. The other A., also in Palestine, was situated near Arno. It was in anct. times the frontier tn. of Amorrheus, and later of the tribe of Reuben. It belonged to the Moabites in the time of Jeremiah. The ruins of it are now called Arrayr. For biblical references *see* Num. xxxii. 34, 1 Sam. xxx. 28, 2 Sam. xxiv. 5, 1 Chron. v. 8, Isa. xvii. 2, Jer. xlviii. 19.

Arokszallas is a tn. in Hungary, 44 m. N.E. of Pesth. Has a fine Catholic church. Pop. about 12,500.

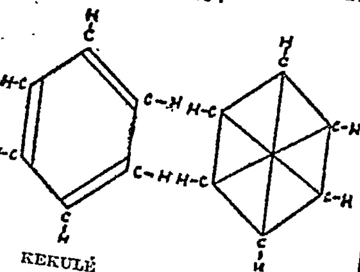
Arolsen, the cap. of the principality of Waldeck, is situated on the Aar, 14 m. S.S.W. of Warburg. The castle, which dates from the eighteenth century, contains a valuable library, Pompeian antiquities, and West's 'Death of Wolfe.' Pop. (1925) 2440.

Aromatari, Giuseppe Delgi (1586–1660), *b.* at Assisi and *d.* at Venice, was a physician and naturalist. He studied logic, philosophy, and medicine at Padua, and practised as a physician at Venice for fifty years, although he had offers from the Duke of Mantua, the King of England, and Pope Urban VIII. He had an immense library, which contained many manuscripts. He wrote *Riposte alle Considerazioni di Alessandro Tassoni sopra le Rime del Petrarca,* Padua, 1611; and also works on medicine and natural history, consisting of an essay on hydrophobia, and a letter on the generation of plants from seeds entitled *Disputatio de Rabie Contagiosa. cui præposita est Epistola de Generatione Plantarum ex Seminibus,* Venice, 1625, and Frankfort, 1626. His proposed work on generation was not completed.

Aromatics, substances characterised by a fragrant, spicy taste and odour, as cinnamon, ginger, eucalyptus, camphor, etc.

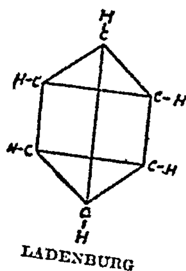
Aromatic compounds form one of the great divs. of organic compounds. They may be looked upon as derivatives of benzene, and are distinguished from fatty or aliphatic compounds by their molecules containing closed chains. The molecular for-

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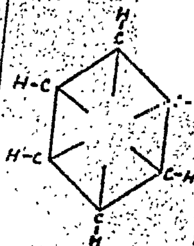
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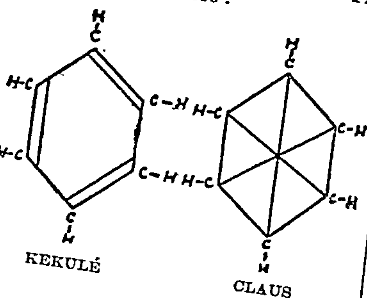
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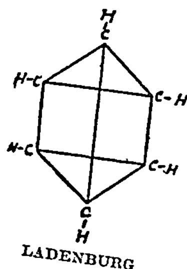
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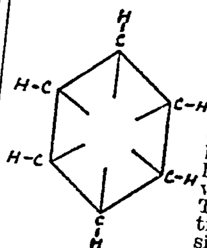
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'arras' is derived from this tn., so famous was it for its tapestry. It manufs. lace, hosiery, sugar, and agric. implements, and has a considerable commerce in corn and oil; pop. 24,835.

Arras, Battle of. The first of the big battles of the third year of the Great War. The previous year (1916) had closed on the doubtful note of the Battle of the Ancre (*q. v.*), which if it accomplished anything for the Allies, had at least the merit of definitively pressing the Gers. back to the 'Hindenburg Line.' This famous line they reached by April of 1917. As a position it left almost nothing to be desired in point of natural and artificial defences, besides giving to the enemy the advantage of a much shorter front than on the Somme and Ancre. Its flaw was the uncertainty of its axes—the positions round Arras to the N. and those of Laon to the S. In the hope of pushing home such advantages as had been gained in 1916, the Allies were now preparing a general offensive on both these axes. The Fr. were to attack on the Laon front and the British on that of Arras. The British general advance began on Easter Monday, April 9, after the usual preliminary bombardment, on a front of about 48 miles, the objectives being in the N., Lens and its surrounding cluster of coal villages, and in the S., Quéant, the nearer end of the hard-contested and powerfully fortified Drocourt 'switch' line. Had the British offensive succeeded in taking these two points, the road to Cambrai vould have been open. All went vell in the opening stages, and by pril 11 the famous Vimy Ridge, ogether with 3000 yards of the ormidable Hindenburg Line, was aken, in addition to over 10,000 risoners and 160 guns. All arms co-perated smoothly, the work of e tanks being a great advance on eir performances of 1916. But ough Lens was hemmed in, Quéant, the other end, was not shaken. now remained for the Fr. to deliver ir blow, and the result was the astrous Battle of the Aisne ghts begun on April 16. (*See* er AISNE, BATTLE OF THE). The of the 'decisive blow,' which was e struck simultaneously at Arras Laon had failed. In March 1918 ers. made a desperate attempt to re Arras, but the British line firm and so saved not only that ut also Amiens (*q.v.*).

astre, a Mexican and American mill for grinding ore.

eboe, Anders Kristensen (1587– a Dan. poet. After having d at Copenhagen University, he took holy orders, and becan Bishop of Trondhjem in 1618. H conduct of life being, however, suc as to disgrace his office, he was d posed therefrom, and lived in retire ment till his death. His chief work was the *Hexameron, or Six Days o the Creation*.

Arredondo, Isidoro (1653–1702), a Spanish painter. He was the pupil first of Joseph Garcia, and then of Francisco Ricci. He was employed by Charles II. to paint his portrait, and the frescoes of the palace of Buen Retiro are his work, but his most famous picture is that of 'Psyche.'

Arreoy, an old institution of the Society Is. It was believed to involve infanticide for political purposes, but we have very little authentic information about it. Cook brought the first account of it to Europe in 1771, and other accounts have been given by Dr. Forster and by Ellis in his *Polynesian Researches*.

Arrest is the restraint of a man's person, in order that he may be compelled to obey the law, or be brought to trial. It is defined to be the execution of the command of some officer of justice or some court of record. As in England can take place in either civil or criminal cases. In civil cases, however, it is only in somewhat exceptional instances that A. takes place. The chief, and practically the sole, cause of such A. is 'contempt of court'; all the superior courts have power to A. persons for this reason. This is done by the issue of a writ, by an order of the court or of a judge to the sheriff. Imprisonment for debt was ended by the Debtors Act, c 1869, and consequently the wri 'capias ad satisfaciendum' is nov rarely issued. It is only made use o in such cases as are excepted from the above Act; such are, when non-payment involves contempt of a competent court, or when a trustee refuses to comply with the order of a court of equity. A debtor may also be arrested to prevent him from absconding or removing his property out of the jurisdiction. A. 'in mesne process,' that is, during the progress of a suit, is now abolished, with the above exceptions. The following are exempt from A. on civil process; Ambas. or diplomatic representatives of foreign courts, peers of the realm, members of parliament, clergymen during divine service, or on their way to or from service, and all persons attending a court of justice in any capacity, such as witnesses, solicitors, counsel. No person is, however, exempt from A. for contempt of court.

All persons whatsoever are liable to

A. in criminal cases; any man may A. without warrant or precept, and outer doors may be broken open for such a purpose. The A. may be either with or without a warrant. A warrant is an order addressed to a peace-officer by a judge or magistrate. If the person named thereon is not in the jurisdiction of the issuing authority, the warrant must be 'backed' by a magistrate of the place where he actually is. A private person is entitled to A. any one who commits a felony, or inflicts a dangerous wound on any one, in his presence, any one whom he has good cause to suspect of felony, or any one whom he discovers committing certain offences specially provided for by statute. The remedy for wrongful A. is an action for false imprisonment.

Arrest of Judgment, *see* JUDGMENT.

Arrest, Henry Louis (1822–75), a Ger. astronomer, was *b.* at Berlin and *d.* at Copenhagen. He was a pupil of Johann Franz Encke; in 1848 became professor of astronomy at the observatory of Leipzig, and in 1857 was appointed professor at Copenhagen, where he founded a new observatory. He made sev. discoveries in astronomy, and pub. works on the subject.

Arrestment, a Scottish legal term, is the process by which a creditor detains the goods or effects of the debtor in the hands of a third party till he is paid. It is divided into two kinds: (1) A. in security is used when a claim has not yet become enforceable, as at the commencement of the legal proceedings; (2) A. in execution is used following on a decree of the court, or on a registered document. A. merely retains the effects; the process of 'furthcoming' is necessary to realise on them. Such funds as are necessary for the sustaining of life are not liable to arrestment.

Arrhenius, John (1811–89), a celebrated Swedish botanist and agriculturist, *b.* at Kloefdala, in Sweden. He was a member of the scientific societies of Upsala and Stockholm; sev. plants have been named after him.

Arrhenius, Svante (1859–1927), a Swedish scientist, *b.* at Upsala; studied and began to teach at Upsala University; became a professor of physics at Stockholm in 1891. He was awarded the Davy medal in 1902, and became a member of the Chemical Society in 1898. His theory of electrolytic dissociation is a valuable contribution to science; his *Text-book of Electro-Chemistry* has been translated from the German by M'Crae. He published *Destinies of the Stars* (Eng. trans. by Fries) in 1918, and the year before he *d.* he issued a revision of two of his earlier astronomical works.

Arrhidæus, or Aridæus (*d. c.* 317 B.C.), a son of Philip III. of Macedonia and a courtesan, was half-brother to Alexander the Great, and on his death in 323 B.C. was named his successor. He married Eurydice, grand-daughter of Philip's elder brother, Perdiccas, and, being of weak intellect, became the tool of his father-in-law, his wife, then of Antipater and Polysperchon. He and Eurydice were put to death by Olympias, mother of Alexander.

Arrhythmia, a medical term applied to irregularity of the action of the heart, manifesting itself in a lack of rhythm in the beat of the pulses, etc.

Arria, the wife of Cæcina Pætus, who, when her husband was implicated in the plot of Scribonianus against the Emperor Claudius and condemned to death, resolved not to survive him, and stabbing herself with a dagger, then handed it to her husband with the words, 'Pætus, it does not hurt.' Her daughter Arria would have imitated her example in similar circumstances, but was dissuaded by her husband for the sake of their children. She was sent into banishment.

Arrianus, Flavius (*c.* A.D. 100–170), a native of Nicomedia, in Bithynia. He was admitted to the citizenship of Athens, but came over at an early age to Rome; he was a disciple and friend of the Stoic philosopher Epictetus. He was appointed prefect of Cappadocia in 136, and distinguished himself by a campaign against the Alani. He was later, under Antoninus Pius, raised to the rank of consul; this was the first instance before the third century when a first-rate Rom. command was given to a Gk. He spent a considerable portion of his time at Athens, where in 147–8 he was appointed archon. But within four years of his being raised to consular rank he apparently retired from public life, and devoted himself to the study of literature in his native place. By his conservation of notes on Epictetus' lectures he constitutes the chief authority for Stoic ethics, whilst his most important original work, the *Anabasis of Alexander*, is our chief authority on its subject. Complete works were ed. by F. Dubner (1846); English trans. by Rooke (1812), E. J. Chinnock (1893).

Arriaza y Superviela, Juan Bautista de (1770–1837), Spanish poet, *b.* at Madrid, served first in the navy and later in the diplomatic service, becoming secretary of the legation in London and then in Paris. In 1807 he returned to Spain, and was active on behalf of the monarchy, both directly

and by means of his patriotic verses; and in 1814 became Minister of Foreign Affairs. His works included *La Primicias*, 1793; *Emilia*, 1803; *Poesias Patrioticas*, 1810, and are collected in the *Biblioteca de autores españoles*, vol. 67.

Arrière Ban, a feudal summons to all freemen to follow their sovereign to the field with vassals, provender, etc.

Arrighi, J. T., Duke of Padua (1778–1853), a Corsican general, was *b.* at Corte, in Corsica, and *d.* at Paris. He distinguished himself in the Egyptian campaign, and in 1809 was made general and Duke of Padua. He also took a leading part in the battle of Leipzig, 1813, and in the campaign of France, 1814. In 1849 he was appointed deputy for Corsica at the legislative assembly, and in 1852 was made senator.

Arrighi de Casanova, Louis Honore Hyacinthe Ernest, Duke of Padua (1814–1888), was a politician, and the son of J. Arrighi, Duke of Padua. He was appointed chief administrator of Seine-et-Oise, and senator in 1853, on the death of his father. After the revolution of 1870 he took up the cause of Bonaparte, and in 1876 and 1877 was appointed a member of the Chamber of Deputies at Calvi.

Arris is an architectural term, which signifies the line in which the two straight or curved surfaces of a body, forming an exterior angle, meet each other.

Arris Fillet, a small triangular piece of wood, used to raise the slates of a roof against the shaft of a chimney or a wall, to throw off the rain. It is also used to form gutters round skylights.

Arrivabene, Count John (1787–881), an Italian economist. He was mprisoned in 1821 for not denounc-ng Silvio Pellico, the poet and atriot. In 1822 he was condemned . death, but went into exile to lgium. He returned to Italy in 57, and was appointed senator. ch of his time was devoted to the dy of political economy, and he te several works on the subject.

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and by means of his patriotic verses; and in 1814 became Minister of Foreign Affairs. His works included *La Primicias*, 1793; *Emilia*, 1803; *Poesias Patrioticas*, 1810, and are collected in the *Biblioteca de autores españoles*, vol. 67.

Arrière Ban, a feudal summons to all freemen to follow their sovereign to the field with vassals, provender, etc.

Arrighi, J. T., Duke of Padua (1778–1853), a Corsican general, was *b.* at Corte, in Corsica, and *d.* at Paris. He distinguished himself in the Egyptian campaign, and in 1809 was made general and Duke of Padua. He also took a leading part in the battle of Leipzig, 1813, and in the campaign of France, 1814. In 1849 he was appointed deputy for Corsica at the legislative assembly, and in 1852 was made senator.

Arrighi de Casanova, Louis Honore Hyacinthe Ernest, Duke of Padua (*1814–1888*), was a politician, and the son of J. Arrighi, Duke of Padua. He was appointed chief administrator of Seine-et-Oise, and senator in 1853, on the death of his father. After the revolution of 1870 he took up the cause of Bonaparte, and in 1876 and 1877 was appointed a member of the Chamber of Deputies at Calvi.

Arris is an architectural term, which signifies the line in which the two straight or curved surfaces of a body, forming an exterior angle, meet each other.

Arris Fillet, a small triangular piece of wood, used to raise the slates of a roof against the shaft of a chimney or a wall, to throw off the rain. It is also used to form gutters round skylights.

Arrivabene, Count John (1787–1881), an Italian economist. He was imprisoned in 1821 for not denouncing Silvio Pellico, the poet and patriot. In 1822 he was condemned to death, but went into exile to Belgium. He returned to Italy in 1857, and was appointed senator. Much of his time was devoted to the study of political economy, and he wrote several works on the subject.

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manuf. The word has been adopted to imply (1) a repository or magazine of arms and military stores of all kinds, both for land and sea service; (2) a public establishment where arms and equipment are manufactured; and hence (3) a repository of any kind of warlike equipment. An A. of the premier or first class includes gun and carriage factories, laboratory, ammunition and small-arms factories, harness, saddlery, and tent factories, powder factory, and spacious storehouses. In an A. of the second class the factories are replaced by workshops. As an A. is a source of supply during war, great care is taken to erect it in a suitable position. As. of the first class should be situated at the base of operations, secure from attack, at a safe distance from the frontier.

The prin. As. in Great Britain are Deptford, Chatham, Sheerness, Portsmouth, and Plymouth. Gov. foundries at Woolwich and small-arms factories at Enfield. Malta, Gibraltar, and Calcutta are the chief overseas As. The subdivs. of branches in a large A. are (1) storekeeping; (2) construction; (3) administration. Under (1) are the depts. for armoury, ordnance, magazines, harness and saddlery. Under (2) come ammunition, laboratories, and firearms of all descriptions, and under (3) clerical work and its officials.

The chief continental naval As e—*France*, Cherbourg, Brest, Tou n, Bordeaux; *Germany*, Kiel, and e inland factory at Essen; *Russia*, onstadt, Leningrad, Sebastopol; *ly*, Naples, Spezia, Genoa, Venice; *in*, Carthagena, Cadiz, Barcelona; *tugal*, Lisbon. For American As. UNITED STATES—*Army*—*Navy*.

rsenic, a chemical element which nerally looked upon as a semi- l, connecting, with antimony bismuth, the great div. of non- ls with that of metals. The is often applied to the white of A. (As_4O_6) which is the most tant compound commercially. element occurs in very small ty in nature; it is more usually as the trioxide in arsenolite, as phide in orpiment and realgar, compound with iron, cobalt, n arsenical iron and mispickel nical pyrites, FeSAs. The A. of commerce is chiefly by strongly heating mis- earthenware retorts from e air is excluded, when most sublimes, together with a phur. The crude metal is used as a poison for flies, constituent of lead shot, a ntity of A. hardening the cilitating the formation of the spherical globules. The pu metal may be obtained from th white oxide by heating it with carbo in the absence of air, which may b effected by covering the oxide in a narrow test-tube with dry powderec charcoal, and nearly covering the mouth of the tube with the finger when heating. The A. sublimes on the cool part of the tube as a dark grey powder.

A. has an atomic weight of 75, a sp. gr. of about 5·5 and a specific heat of ·083. It crystallises in rhombohedra, and rapidly vaporises at temps. above 100° C. The sp. gr. of the vapour is 150 (H=1), so that the gaseous molecule of the element must be looked upon as including four atoms.

The chief compounds of A. are the hydride AsH_3, the arsenious oxide As_4O_6, A. oxide As_2O_5, the disulphide As_2O_2, the trisulphide As_2O_3, the trichloride, tribromide, tri-iodide, trifluoride ($AsCl_3$, $AsBr_3$, etc.). Arsenious oxide is formed when arsenical ores are roasted in air; it is sublimated as a white powder. A. oxide is produced when the lower oxide is heated with nitric acid. The two oxides are th anhydrides of the two acids, arseniou acid and A. acid, which may be distinguished by the *colours* of their silver salts; the addition of ammonia-silver nitrate producing a canary-yellow precipitate of the arsenious salt or arsenite, and a brick-red precipitate of the A. salt or arsenate.

As the A. compounds are extremely poisonous, it is of great importance that efficient tests of their presence should be known. Organic matter should first be expelled by digesting with hydrochloric acid and potassium chlorate, chlorine being driven off by boiling. The A. is then precipitated as a sulphite, which is dried, mixed with potassium cyanide, and heated. The A. is then deposited as a black sublimate, which is converted into arsenious oxide if heated in air. The oxide may be recognised by the production of a yellow precipitate with ammonia-silver nitrate solution, or by a precipitate of Scheele's green with ammoniacal copper sulphate. Reinsch's test consists of boiling a strip of copper foil in the given solution with the addition of hydrochloric acid. If A. is present, it is deposited in the copper and may be recognised as in the previous test. Marsh's test depends on the production of the hydride AsH_3. An apparatus for the preparation of hydrogen is fitted with a narrow jet, at which the hydrogen is lighted. If a piece of porcelain be held in the flame, no stain is produced if the materials used for the production of

hydrogen are free from A. The solution to be tested is poured into the hydrogen generating apparatus; if A. is present, the flame assumes a lavender tint and a black stain is produced on the porcelain.

In medicine, arsenious oxide is used as an alterative and tonic in doses of from 1–60th to 1–15th gr. The most frequently used preparation is that known as Fowler's solution, which comprises arsenious oxide and potassium carbonate together with a small quantity of compound tincture of lavender. This is administered in doses of 2 minims, largely diluted, and gradually increased to 8 minims. In small doses it acts as a stomachic and is valuable in gastric neuralgia and in the vomiting of chronic alcoholism. In larger doses it acts as a nerve tonic, entering the blood by absorption. Used externally, it is a powerful caustic, and its use has been advocated in cancer, lupus, and epithelioma. Large doses of A. preparations produce a burning sensation in the throat, stomach, and abdomen, followed by vomiting, diarrhœa, cramps, exhaustion, and collapse. Symptoms of arsenical poisoning are frequently observed in those working with arsenical pigments, or in those living in rooms where arsenical pigments have been used in the preparation of the wall-paper. In recent years, widespread poisoning was caused by the presence of A. in a supply of invert sugar used in the brewing of beer. By commencing with small doses and gradually increasing the quantity, a certain degree of tolerance is acquired, as in the case of the A. eaters of Styria, who have been known to swallow more than six times the minimum fatal dose with no untoward results.

The stomach pump or emetics are to be used in the treatment of arsenical poisoning. Large doses of castor oil are essential to clear out the intestinal tract to prevent reabsorption. A good antidote is provided by freshly prepared peroxide of iron, produced by adding soda or ammonia to the tincture of iron.

Arsenius (354–450), probably of Rom. extraction. Gained fame for his knowledge of Gk. and Rom. literature. Theodosius the Great appointed him as tutor to the princes Arcadius and Honorius. Afterwards lived a secluded life in an Egyptian monastery of Scetis, and *d.* at Memphis. Wrote a work containing instruction for monks. Commemorated by Rom. Catholics on July 19 and by Orthodox Eastern Church on May 8.

Arsenius, Autorianus (thirteenth century), patriarch of Constantinople. Educated at a monastery in Nicea. Became an abbot. Retired into solitary asceticism in a Bithynian monastery. Called to be a patriarch A.D. 1255 by Theodore II. Larceris. Excommunicated Emperor Michael, who banished him to Proconnesus, where he *d.* 1264. The new patriarch Josephus absolved the emperor, and this led to the quarrel between the Josephists and Arsenites known as the 'Arsenian Schism,' which lasted until 1315.

Arsiè, vil. of Belluno, Italy, 3 m. S.W. of Fonzaso. Pop. of vil. 1727: of commune, 7127.

Arsinoë, an anct. city of Egypt, the name of which was derived from Arsinoë, the wife of Ptolemæus Philadelphus, but seems to have been changed to Cleopatris. The site of the modern Suez almost corresponds to that of A. (Strabo, xvi. 769). A. was also the name of one of the anct. provincial divs. of Egypt which corresponds to the modern Fayoum.

Arsinoë, daughter of Lysimachus, King of Thrace, and first wife of Ptolemy II. Philadelphus (285–247 B.C.). Banished to Coptos for conspiring against her husband. Her son afterwards became king under the title of Euergetes.

Arsinoë (*b. c.* 316 B.C.), daughter of Ptolemy I. Soter and Berenice; married Lysimachus, King of Thrace. Murdered her stepson Agathocles in order to secure the succession. After her husband's death she fled to Ephesus and thence to Cassandria. Afterwards married her brother Ptolemy II. Her devoted husband gave her name to several cities. She was also worshipped as a goddess.

Arsinoë (*d.* 41 B.C.), youngest daughter of Ptolemy XIII. and sister of the famous Cleopatra. During Cæsar's attack on Alexandria the inhab. recognised her as their queen. Cæsar took her to Rome with him. After Cæsar's victory she was allowed to return to Alexandria. She was put to death at Miletus after the battle of Philippa by order of Mark Antony, and at her sister's request.

Arsinotherium, an enormous fossil mammal of the Ungulate type, discovered by Beadnell in the Upper Eocene of the Fayoum deposits of Egypt. It resembled a rhinoceros in appearance and was herbivorous. Its brain was small, the head massive, and it bore two pairs of horns.

Arsis and Thesis (Gk. ἄρσις, from αἴρω, I raise). A. is that part of a poetical foot on which the stress of the voice falls, the rest of the foot being called the Th. According to original Gk. usage, A. denoted the raising of the hand or foot in dancing, thus denoting the unaccented part of the metrical foot, and Th. denoted the

fall of the foot, and thus the unaccented part of the prosodial foot.

Arsmetrik, old term for arithmetic in Chaucer's English.

Arson (Lat. *ardere*, to burn). The malicious burning of a dwelling-house or outhouse of another. Under Rom. civil law it was punishable by death. In anct. laws of England it was known under the term boernet. Under the Saxons it was punishable by death, and still remained a cap. crime on the consolidation of the laws in 1827 and 1837. The Eng. law concerning A. was repealed and replaced by the Malicious Damage Act in 1861. By this Act A. was punishable by penal servitude for life or minor degrees of punishment. By the common law of A. it is required that some part of the house or other building be actually burnt. An attempt or intention does not constitute the offence, but the burning of any part, however trifling, is sufficient to complete the offence. If any person be in the house at the time of burning it is a capital offence.

Under the Malicious Damage Act of 1861 persons setting fire to any place of divine worship, dwelling-house, farm-house, factory, outhouse, any public building, or setting fire to any place with intent to defraud any person, are liable to be sentenced to penal servitude for life, or for any term not less than three years. Setting fire to crops is punishable by penal servitude for not more than ourteen years.

In Scotland A. is known under the erm wilful fire-raising.

Arsonval Arsène d' (*b.* 1851), a Fr. hysician who was *b.* at Laborie Haute-Vienne, France. He beme doctor of medicine, 1876, and ofessor of medicine in the 'Collège de ance,' 1894. He was a member of e Academy of Medicine, 1888, and of Academy of Science, 1894. He has . many scientific works, and has de various scientific investigans.

rt. There are two accepted deions of the term *art*, neither of ch entirely covers all that the l implies. One states it to be *the g of a thing*, as opposed to *the ing of a thing*, which the word ce means, whilst the other ems all that is not done by man in ay of utility; in other words, all ne does in the way of luxury or ure. There is evidence in the 's history to support the latter lisation, for it is found that s have produced the best A. in ars of prosperity, but that a f great struggle, or a wave of rcial anxiety has proved inimit is usual to go back to the mmerings of A. for a clue to the impulses that generated it. Al though most modern thinkers see in primitive examples merely the desire to beautify the tool, the cave wall, or whatever surface received the decoration, others have doubts as to whether such efforts were not prompted by religious motives. M. Salomon Reinach points out that all animals represented in the quaternary period are of the comestible kind, and he infers therefrom that the primitives practised their A. to propitiate the forces controlling their welfare. In the Spanish caves of this period are paintings of over a hundred animals of large size, invisible in the daylight. They must therefore have been executed by artificial light, and it is hard to suppose that such toil for such meagre spectacular result would have been undertaken with more decorative intent. It has further been computed that the various phases of A. devoted to *teaching* occupy periods amounting to ten times as many centuries as do those concerned with *pleasing*. The figures in Egyptian and Assyrian processions are mere symbols—a part of ceremonial or contemporary history. The beginnings of Christian A. show again the use of symbolic figures for the same didactic purpose. Luxury and diversion were clearly not the impulse of these manifestations, and yet it is impossible to deny that æsthetic ideas were in the minds of their authors. Granting that these pictured forms did teach, they must have done so by impressing the spectator; and where they propitiated they certainly must first have pleased. A. can hope to do no more in the twentieth century.

The principles of æsthetics have become so much an essential part of all considerations of A. matters that it is *feeling* more often than *doing* which is implied now by the word *art*. 'So-and-so may be a clever painter, but he is no artist,' is a remark one often hears. It derogates the particular painter's work to an early definition of A. when the As. were the trades, the tradesmen being artisans. But feeling alone no more fills the definition of A. than does manual skill alone. A. is only completely expressed when material is re-formed, re-created, re-fused by what R. L. Stevenson called 'the ardour of the blood' and what is known as the *Divine afflatus*. The actual re-formation of the stone, metal, or pigment may fall short of the workman's ideal; but if it have realisation enough to frame and hand on the author's message, to show eloquently and appealingly that for which the mind and the heart of the author could find no

other utterance, then that work is a work of A.

This '*message*,' '*voice*,' '*mood*' of the work of A. was held by the classic mind to characterise everything under the ægis of the muses (of which *music* was once the adjective or generic term). Thus music, poetry, and the drama depend also upon A. for their perfection. The industrial As. likewise may be more or less amenable to an exercise of taste making for luxury and diversion. Hence it is that whilst a farrier is not expected to make horse-shoes but in the approved way, the blacksmith working at the same forge may make a gate that one day might find its way into a museum of objects of A. Farriery therefore is not an A., but smithing perchance may be.

To avoid confusion between all such industries possibly amenable to the artistic sense on the one hand, and the higher activities on the other, wherein material is worked, changed, or put together, not for a utilitarian purpose, but solely to form a medium for the author's emotion, the latter are called by the name of the *Fine Arts*. This term is held to cover architecture, painting, and sculpture, but it does not extend, in common parlance, to music or letters. Possibly the difference at the root of this anomaly in nomenclature is that music and poetry exist in the abstract, and painting and sculpture in the concrete. That, however, would not prove that the former are any less fine as As. than the latter. The 'A. of architecture,' as a term, also offers a little difficulty, for whilst in its highest flights architecture may answer every requirement of a fine A., it is in its dual character almost always concerned with the immediate wants of life, which fact is enough to put it outside one definition of A. at least. Macaulay declared it was half a science, and others have decreed it to be more science than A. On the other hand, it is often regarded as the oldest and greatest of the fine As., for the resaon that painting and sculpture are subsidiary to the buildings they adorn. But that is as much as to say that the ring is more worthy than the engraved gem it holds; and as for priority, we know that the graphic As. were flourishing before men began to build.

We are led to the conclusion that probably the part of architecture that is fine A. is in reality a variety of sculpture, for it works in three dimensions; its beauty and effect are due to design and proportion, and its surface markings count in the complete effect. These are conditions which sculpture beside alone fulfils.

Sculpture and painting remain with a standing against which there seems to be nothing to urge, and the popular idea of what fine A. signifies would appear to confirm this standing. More than ever do the conditions of the pursuit to-day prove them dependent upon the margin that a strenuous age can spare for luxury; notwithstanding the fact that the trades and industries called into being by their application to common needs are more numerous than ever.

All forms of graphic and plastic A. are admitted under the generic names of painting and sculpture, and are broadly divided as *naturalistic* and *decorative*. This division is often no more than one of point of view, for it is obvious that the Parthenon frieze was both, as were the pictures of the Venetian masters. The various subdivisions of fine A., such as the *idealistic*, the *realistic*, the *literary*, and so forth, are necessary to lucid criticism, but they do not affect the question of A., for which all are mediums. The latest developments of naturalistic A. have rather forsaken the literary or story-telling phase, even in book-illustration, which is now more decorative than naturalistic in its best forms. But literary A. will always make a strong appeal to the popular mind which naturally thinks first of anecdote, being more alive to the joys and woes of life than to the finer-drawn sensations of A. for A.'s sake felt by critics.

The terms *idealistic* and *realistic* are used in criticism to signify two opposite methods of approach on the part of the artist. The idealist is one who gives form to incidents and scenes that have generated partly or wholly in his own mind. He may, and usually does, get the germ of his subject from something seen, but the material is gestated, so to speak, and the result appears with more generalisation and psychological import than its actual prototype possessed. The realist, on the other hand, labours to give a likeness of the actual incidents, and if the scene is a beautiful one and lovingly presented, the work may rise to the highest position in fine A., as did some pictures by Holman Hunt and by Millais in his Preraphaelite days. Turner would rank as the greatest idealist. In figure work the poles may be instanced by Watts on the ideal side, and by Meissonier on the real. Sculpture offers Phidias and Donatello respectively. But the case cannot be left so simply stated, because the two phases are, in a manner, combined in the finest works of A. It is evident that the idealist is really more in need of knowledge born of observation and study than

is the realist, since the former does not oblige himself to copy from nature; and were he, moreover, not realist enough to carry conviction, his idealism would be but futile and meaningless. The more thoroughly a Turner could know the realities of sunsets and thunderstorms, the more magnificent or appalling could he render them by invention. It is the power of communicating the spiritual or romantic force of things to the spectator that constitutes idealism in A. The realist also might imagine scenes, but he would present them in such a way that they might be mistaken for topographical records. They might be beautiful examples of fine A., but they would not be ideal. Fine A. must interpret, however, and inasmuch as the spirit stirs more deeply than the letter, the idealist is in a better position than the realist to set up that correspondence of feeling between artist and beholder which fine A. demands.

Of decorative A. the great mass finds expression in the crafts and industrial As. Much of it takes the form of *ornament*. But mural painting and stained glass belong legitimately to the fine As. when they rise above the level of commercial mediocrity. Recent years have witnessed an increasing movement against naturalism, as being a phase antagonistic to the idea of the space decorated. The idea of this space, it is held, hould not be forfeited to pictorial ideas. In the belief that such matters as linear and aerial perspecve, round modelling, natural action, odulated colour, and other characristics of realism, prevent the wall on which they appear from looking e a wall, modern decorative artists ve adopted archaisms as a safeard against the naturalistic view of ngs. The great decorative painters, chelangelo, Veronese, Rubens, and ers, strove, on the other hand, to inate the idea of the wall, and to end represented starry heavens ilings, columns and openings in spaces, and gave to figures a pective view from the floor. For most part decorative A. shows of free growth only in sporadic s to burst the bonds of its conons.

altogether different view-point wever, possible—namely, that regards both the idealistic and listic approaches as belonging ategory of naturalistic A., and re as opposed to another con- of A. which stresses its abqualities, that is to say, the s which constitute design together from its relation to r the natural objects which it may represent. From that poin of view the Egyptian lioness in th British Museum is better art than Landseer's lions on the Nelson Monument, and the Italians of the Renaissance, generally speaking, are better designers than the Flemish or German artists of the period. Of recent years distinction between the naturalistic or representational and the purely aesthetical or abstract qualities of A. has become more and more emphatic, leading eventually to designs in sculpture and painting which show no or only barely discernible relations to nature or natural objects.



QUEEN NEFRET-ITI
(*Egyptian Sculpture*)

The history of A. overlaps the history of civilisation. Quaternary A. dates from ten to twelve centuries before the Christian era. A gap then occurs until the polished Stone Age, some 4000 years B.C., when pottery and an elegance in the fashioning of tools bespeak taste. Personal ornaments having intricate linear decoration appear in the Bronze Age, when dolmens and cromlechs point to the dawn of architecture. A. in Egypt, which began c. 4000 B.C., had progressed far before bronze and iron was used, producing weapons and ornaments carved and engraved in ivory, gold, and other materials. The vast halls of Egypt with many columns, some of which were 70 ft.

high, were covered with coloured reliefs, and held colossal statues in 'the round.' Assyrian or Chaldean A. was contemporaneous, but its sculpture was almost restricted to bas-relief, although it had fewer conventions than the Egyptian. The most obvious of the latter was that its torsos were almost invariably at a front view, though combined with limbs and heads in profile. Assyrian sculpture was characterised by prodigious technical skill and by types of great muscularity and sturdiness. To this nation is due the invention of the vault and dome. About 3000 to 2000 B.C. Gk. A. rose in the Archipelago with rude representations of



THE DISCUS-THROWER

(Greek Sculpture)

[th]e human form. Next Crete became [th]e centre of more realistic and ele[ga]nt efforts. The palace of Minos [at] Cnossus—recently excavated by [...]ans—yielded reliefs and paintings [poi]nting to a very advanced civilisa[tio]n. Schliemann excavated Troy, [My]cenæ, and Tiryns, in which spots [the] evidences of the plastic genius [of t]he period richly abounded. My[cen]ean A., influenced by Egyptian and [Assy]rian, and developed by the Gk. [love] of life, grew with amazing rap[idity] into fine sculpture and paint[ing]. Of the latter no examples [remai]n, but it is mentioned by Gk. [write]rs in terms of high praise. By [...] B.C. Gk. genius, in the persons [of Phi]dias, Polyclitus, and Myron, had risen to the high level evidenc[ed by] the frieze of the Parthenon. archaism had been thrown off [...] Praxiteles, Scopas, and Lysippu[s ad]ded to the Phidian traditions gr[eater] facial expression and sweetness. [The] victories of Alexander closed [the] 'Hellenic' period. From this [time] until the Rom. conquest the 'Hel[lenistic]' period extended. It ad[ded] landscape to the scope of A., in[tro]duced human suffering, as in [the] *Laocoön*, and combined realism w[ith] its magnificence of life and colo[ur]. That the Gk. was always a true art[ist] every discovered object of comm[on] utility bears proof. Zeuxis, Apelle[s], and others were painters of who[se] work only one wreck exists; but dec[orated] vases survive in plenty whic[h] show beauty of form and grace of in[vention]. Engraved gems have come down to us unspoilt by time. They have never been surpassed for the perfection of their beauty and skill. The Roms, although they imported Gk. artists and pillaged Gk. soil for objects they had the taste to admire, were nevertheless possessed of a native A. which produced the viaducts, arenas, and other great works of utility. The Roms., like the Assyrians, made use of the arch and the dome. Their statues and reliefs are vigorous and realistic. Especially great are their vivid portrait busts. From the Rom. A. and architecture, influenced by Oriental and Hellenistic art, evolved the Byzantine. The early Christian churches were modelled upon the Rom. basilica, and ornamented with mosaics stiff in design but gorgeous in colour. Byzantine A. avoided sculpture in the 'round,' as appertaining to idols. Its carvings, embroideries, and enamels were coveted all over Europe, and the epoch was one of great wealth and magnificence. The Rom. basilica, by the principle of the round and pointed arch, developed respectively into Romanesque or Gothic building. The Gothic being the later stage, gave rise to a lively, human and intensely naturalistic sculpture, free from the conventions that always hampered the Romanesque.

The fourteenth century saw the first Italian painter of genius, one Duccio, who appears to have annulled the claims of Cimabue to that honour. Giotto, the Florentine, was inspired by the naturalism of the Gothic masters. Masaccio, in painting, and Donatello, in sculpture, carried these new views further.

The Renaissance period dates from the fifteenth century, when classic remains recalled men to the older ideals. Its result in architecture was that every nation adapted the classic elements to its own special

needs. Leonardo da Vinci, the most universal genius that ever lived, …

… is that of the *Gioconda*—became a pattern for less talented workers. Michelangelo was likewise a widely gifted genius, though pre-eminently a



GIOCONDA

sculptor. The poetic grace of the human form in action was his passion, wherein he outdid the Gks. in the boldness of his ideas. His greatest work in painting is the ceiling of the Sistine Chapel. Raphael's works are well known. He has been called the 'Divine Painter' and 'the Prince of Painters,' and though not quite so highly esteemed to-day, his sweetness and charm, his mastery and suavity, still command. In Venice painting was distinguished by rich full colour, and a … f motive. It boa … of Mantegna, … Titian, Tintor … Although the names of Flemish artists are not household words like those of Italy, yet Gothic A. had been foremost in achieving noteworthy sculpture and painting before Italy in the fifteenth century. Italy and Flanders influenced each other. The brothers Van Eyck, Matsys, and others, are to-day greatly esteemed. The former are commonly credited with the invention of oil-painting, which, however, was practised as early as the twelfth century. Jan Van Eyck's portraits are unsurpassed as searching documents of character, Memling holding perhaps the second important place. The realism of the Flemings was associated later with Italian idealism in the person of Mabuse and others; but Flemish A. as a whole dealt with realities which it endued with a poetry of its own. Germany showed no such early awakening. In the fourteenth century Wilhelm of Cologne heralded the line of masters, Schongauer and Holbein the Elder follow. It is not until the sixteenth century that Germany, with Dürer and the 'Little Masters,' takes her due place. As an engraver Dürer manifested himself as the superior of all. Holbein the Younger was a portraitist of idealist tendencies, a consummate draughtsman, and a designer of exquisite fancy. After Michelangelo, Italy's artistic fire dwindled. Its traditions became an obsession, and nature was forgotten; but early in the seventeenth century Caravaggio set a new fashion of violent lighting. In Spain, Ribera, and after … gloomy … escaped. … school, … degree.



MICHELANGELO'S ADAM

(*Sistine Chapel*)

Italian masterpieces did not affect him. Murillo was blander and less direct. He did not profit by the adroit seizure of tonal values which Velazquez displayed. Protestant Holland in the seventeenth century had no call for religious works, but was prolific of portraits, *genre* sub-

The term was derived from a title given incidentally to one of his pictures by Monet, their leader, and the 'school' included, by conventional use rather than strict principle, Camille Pissarro, Sisley, Berthe Morisot, Degas and the Franco-American Whistler. Seurat and Signac represent their Neo-Impressionist offshoot.

Just as France possessed in Chardin in the eighteenth century a French forerunner of the Impressionist school, so England possessed in William Blake a forerunner of Expressionism (*q.v.*), the Romantic movement of the Continent had in the English Pre-Raphaelites, comprising Ford Madox Brown, Rossetti, Holman Hunt and the earlier Millais, its somewhat belated counterpart. Amongst the British Academic painters of the last century Etty, Hall, Watts and Orchardson remain of some account, though Sidney Cooper, Lord Leighton, Marcus Stone, Peter Graham, Alma-Tadema and the later Millais were the popular favourites.

Manet and the French Impressionists exerted an important influence on European artists generally. Amongst them may be mentioned Israels, Mauve, Mesdag, Jongkind and the three brothers Maris in Holland; Liebermann in Germany; Segantini and Boldini in Italy; Sorolla in Spain; Kröyer in Denmark, etc. In Great Britain: Reid, Guthrie, Lavery, Stanhope Forbes, La Thangue, Sargent, officially an American, Clausen, Edward Stott, Wilson Steer, Augustus John, William Nicholson, Walter Sickert and Sir William Orpen are all more or less associated with this movement, as also Frank Brangwyn, the first inspired by Oriental travel to break away in England from the optical uracies of the Impressionists, and t to the Frenchman Puvis de vannes the most important orative painter of his age.

he decorative qualities of Far orn A. had, however, been gnised already as far back as ixties of the last century, when nese colour prints (*q.v.*) first began rive in Paris, there creating a ble furore and modifying the ssionists' method of design. y be seen, for instance, in er's 'Battersea Bridge,' now Tate Gallery, and it had a l effect on the principles of design as seen in the evolu- posters and decorative A. here to be noted that photo- nd the far greater facilities and transport which steam ando possible completely nised the older conception of æsthetics. Discoveries of arts of primitive peoples, *e.g.* Africa and Australasia, and civilisations, *e.g.* in Troy, Cr Mesopotamia, Egypt, India, Turk tan, Peru and Central America, ma it abundantly clear that the Rena sance ideals and the views of t eighteenth century æstheticia founded on the excavation of Pompe and Herculaneum were no longe tenable, since everywhere new form of æsthetic value were encountered or unearthed.

The greatest individual influence in the resultant revolt against academic, idealistic, realistic, and impressionistic naturalism was, however, that excited, albeit quite unwillingly, by Cézanne (*q.v.*), who, himself originally an Impressionist,



WOMAN WITH ROSARY *Druet*
(*Cézanne*)

aimed at combining Impressionistic truthfulness of light, colour, and tone relations with firmly constructed designs such as is found in the classical compositions of Nicolas Poussin. The movement thus unwittingly started by Cézanne has been conveniently named Post-Impressionism (*q.v.*). The Post-Impressionistic developments have known many different and sometimes contradictory aims, but they have nevertheless one thing in common; they all regard the work of A., whether it be sculpture or painting, *primarily* as a reality, and not as an illusion or a counterfeit of nature. In this sense there is a sharp cleavage be-

tween academic, idealistic, realistic, romantic, and Impressionistic A. on the one hand, and Post-Impressionistic A. on the other, all the former categories being founded upon natural forms, whilst the last rests preeminently on the artist's autonomous creative will. It is essentially the art of the twentieth century. Amongst the most important 'modern' painters are Gauguin and Van Gogh who with Cézanne, belong to the nineteenth century, Munch (Expressionist), Henri Matisse (Fauvist), Picasso (Cubist), Severini (Futurist), and a whole host of the younger living generation.

In Russia Bolshevism has developed, out of French Cubism and German Expressionism, a purely abstract and political A. serving the purpose of its political aims.

Sculpture (*q.v.*) has also undergone an evolution parallel to that of painting. It began in the nineteenth century with the classicism of Canova, Thorwaldsen and Flaxman, had in the middle of the century Alfred Stevens, and later Alfred Gilbert as the imitators of the Renaissance, whilst the most famous sculptor of the century Rodin may be regarded as an Impressionist. In the nineteenth century Bourdelle stands for a kind of Rodinesque Gothic Romanticism, Mestrovic for a Serbian National Romanticism, Maillol for Neo-Classicism, whilst Archipenko, a Parisian Russian, and Brancusi represent Post-Impressionism in its most abstract sense.

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Art Exhibitions. Whether organised for profit or otherwise, A. E. in Britain have become increasingly popular in modern times. Art galleries are always open in London with private shows of the works of artists who are offering them for sale; while, in recent years, public interest in Continental Art has been stimulated by representative exhibitions of Flemish and Dutch pictures in 1927 and 1929, and of Italian art in 1930 at Burlington House. Sir Joseph Duveen, a great patron of art, founded the *British Artists' Exhibitions* for the purpose of increasing the sales of the works of British craftsmen, and has such works in the art galleries of Leeds, Birmingham, Manchester, Bradford, Belfast, Plymouth, Liverpool, and Glasgow, on the Continent of Europe, and in S. America. He has even exhibited pictures on the *Berengaria*, and in 1928 sold one-third of the 300 works shown on a voyage to New York and back.

The most popular annual exhibition is that of the *Royal Academy of Arts*, first held in Pall Mall in 1768, and afterwards in Burlington House, where the 162nd summer exhibition was held in 1930. The exhibits include oil paintings, water-colours, designs in architecture, miniatures, engravings, etchings, and sculpture.

The Royal Soc. of Painters in Water Colours ('Old Water-Colour Society'), Pall Mall, exhibits works of its members and associates in the spring and autumn of each year; the *Roy. Inst. of Painters in Water-Colours*, 195 Piccadilly, exhibits annually works of any artists selected by their committee. In the same building the *Roy. Inst. of Oil Painters* gives exhibitions in the autumn on the same principle. *Roy. Soc. of Brit. Artists*, Suffolk St., S.W., exhibits works of outside artists as well as of members; *Roy. Soc. of Painter-Etchers and Engravers*, 5a Pall Mall,

exhibits yearly works of its members and associates; *Roy. Soc. of Portrait Painters,* founded in 1891, with a limited membership, selects works of members and non-members. Annual exhibitions of the *New English Art Club* are held at New Burlington Galleries, W., and consist of works which the artists have felt to be outside the usual scope of those of other exhibitions.

The Roy. Scottish Academy of Painting, Sculpture and Architecture, Princes St., Edinburgh, held its 104th exhibition in 1930; the *Roy. Hibernian Academy of Arts,* whose buildings in South Frederick Street, Dublin, were destroyed in the Sinn Fein rebellion of 1916, also holds exhibitions; and in Wales, the *Roy. Cambrian Academy of Arts,* exhibits in Conway.

Other well-known galleries with frequent exhibitions in the provinces are the *Roy. Glasgow Institute of Fine Art,* the *Roy. West of England Academy, Roy. Birmingham Society of Artists,* and the *Walker Art Gallery* of Liverpool.

Art Museums. As a nation Britain is rich in the possession of many notable art treasuries, the greatest of which are to be found in London. Some of these are: *The British Museum,* Great Russell Street, W.C.1., which contains a vast collection of [illegible] Rome, Greece [illegible] Marbles) and [illegible] and jewellers' work; ancient pottery; a fine collection of paintings, drawings, engravings (notably some of Albert Dürer), and etchings, located in the Print Room presided over by Campbell Dodgson, and an unique selection of Chinese paintings collected by Laurence Binyon. *Victoria and Albert Museum,* South Kensington, S.W.7, a large building of great importance to the student, with a well-stocked library on art. Its numerous exhibits are classified according to their materials, exemplifying the use of art as applied to industry. *The National Gallery,* Trafalgar Square, W.C.2, contains numerous priceless works of the Old Masters of the Italian, Flemish, Dutch, and British Schools. The *National Portrait Gallery,* adjoining this building, is an interesting gallery of portraits of British celebrities of various centuries. *The Tate Gallery* (National Gallery of British Art), Millbank, S.W.1, is noted for its examples of recent British art. *London Museum,* Lancaster House [illegible] and crafts of [illegible] and Saxon times [illegible] trict, together with topographical pictures of London. *Hampton Court Palace,* Surrey, has many beautiful Italian pictures and some very rare tapestries. *The Wallace Collection,* Manchester Square, W.1, in addition to its [illegible] itish and [illegible] s a treasu[illegible] *Sir John* [illegible] Inn Fields, W.C.2, is celebrated chiefly for its Hogarth paintings; while Kenwood House, Hampstead, N.W.3, bequeathed to the nation by the late Lord Iveagh in 1927, is another example of a private house converted into a museum, with a small but valuable collection of pictures, an Adams room, and some fine pieces of furniture.

Among the provincial A. Ms. are the *Walker Art Gallery,* Liverpool, famous for its pre-Raphaelite paintings, its etchings and sculptures, and its English art of the Middle Ages; the *Manchester Corporation Art Galleries,* with many fine examples of nineteenth century British artists; the *Birmingham Museum and Art Gallery,* with [illegible] works of the [illegible] *Bristol Art Ga*[illegible] the city by Sir [illegible] *Nottingham Castle,* which had been practically destroyed by fire, was restored in 1878 and turned into an A. M.

In Scotland, Ireland, and Wales there are fine museums and art galleries in Edinburgh, Dublin, and Cardiff respectively.

The United States is becoming an increasingly important centre of art, due to the great benefactions of her millionaires. Thus in recent years the Metropolitan Museum of Art in New York City, which was already one of the great museums of the world, has been enriched by legacies of their entire art collections by the late Benjamin Altman and Henry Frick. In each case, these gifts were estimated to be worth 25 million dollars. There were thus added to the museum some of the finest specimens of the work of Rembrandt, Hals and other masters. The Hispanic Museum in New York, which specialises in modern Spanish paintings, h[illegible] moder[illegible] than a [illegible] in Eu[illegible] gift of [illegible] ing-ton, the [illegible] art gallery [illegible] ised [illegible] the work of [illegible] be found else-[illegible] so fine art col-[illegible] Philadelphia, [illegible] Toledo and Cleveland.

On the Continent Italy has the

greatest wealth of art treasures, Rome and Florence containing not one but many museums of the best Italian art, while Venice, Naples, Milan, and other towns possess their great galleries. In Belgium the finest gallery is in Brussels; in Denmark, Copenhagen; in France, Paris; in Germany, in Berlin, Dresden, and Munich; in Greece, Athens; in Holland, Amsterdam; in Norway, Oslo and Bergen; in Russia, Leningrad; in Spain, Madrid; in Sweden, Stockholm; in Switzerland, Zürich.

Art Sales. The change in social conditions in England during the last few years has had a notable effect on A. S. The maintenance of mansions or ancestral homes having become increasingly burdensome, through economic stringency and high taxation, heirlooms have been sold for the high prices they have been able to command. These sales often attract public attention, partly on sympathetic grounds and partly through excitement roused by American competition. In this connection, Sir Robert Witt, in expressing gratitude to the American collectors who had lent pictures to the Italian Exhibition of 1930, said: 'The British public is once more enabled, not only to refresh its memory of some of the ancient glories of its own private galleries that have passed, beyond permanent recall, to the other side of the world, but also to satisfy itself that they are well cared for there and have not as works of art suffered from the change of home. The loss has been here, not there, to this country, not to the masterpieces.'

This rivalry in art collection existed in pre-war days, but not to so great an extent. In 1915 and 1916, during the early days of the European conflagration, there was a natural 'slump' in the sale of heavily-priced pictures. In 1927 a record was created in that more than 130 pictures priced at sums exceeding 1400 guineas ach had changed hands during the ear. Sales dropped short of this r five in the following year and by ght in 1929.

In recent years the paintings which ve realised the greatest prices at ction sales have been mainly porits by Rembrandt, Gainsborough, mney, Hoppner, Vandyck, Reyds, and Raeburn. The portrait Jacques le Roy, by Van Dyck, ised 17,000 guineas in 1929; Holding a Scabbard, by Remndt, 48,000 guineas in 1928; the rait of Miss Mary M. Barrett, vn as 'Dinkie,' from the colour er eyes, by Lawrence, for 74,000 eas in 1926; Anne, Countess of Chesterfield, by Gainsborough, 17,000 guineas, in 1925.

'The Blue Boy,' the portrait Master Buttal by Gainsborough, sold privately by the Duke of We minster in 1921, but before its parture to the Huntington Collect in California, was exhibited in t National Gallery.

The leading Sales Rooms in Londo are Christie's, St. James's Squar S.W.; Sotheby's, New Bond Stree W.; Willis's Rooms, King St., S.W Foster's, Pall Mall, S.W.; Puttick' Leicester Square, W.C.; and Knigh Frank and Rutley, Hanover Squar W. Details will be found in th annual volumes of *Art Prices Current* and in *The Year's Art*, compiled by A. C. R. Carter.

Arta, a tn. in Greece in the prov. of A. It derives its name from the R. Arta, on which it stands. This riv. was, before the Balkan War of 1912, the frontier between Greece and Turkey. A. has many fine buildings, among which are a Byzantine castle; a palace belonging to the Gk. metropolitan; the church of the Virgin of Consolation, built in 819, and many fine mosques and synagogues. Chief manufs. are woollens and cottons, embroidery, Russian leather. Soil is fertile, and gardens and orchards surround the tn. In 1083 it was taken by Bohemund of Tarentum; 1449 taken by the Turks; 1798 Ali Pasha captured it from the Fr.; 1881 ceded to Greece. In Græco-Turkish War of 1897 it was the scene of many slight Gk. successes. Pop. 7489.

Arta, Gulf of, an arm of the Ionian Sea. It is about 23 m. long. Until the Balkan War of 1912 its northern shores belonged to Turkey and its southern to Greece. Fish are plentiful, especially eels, mullets, and soles. On its shores are ruins of many ancient castles.

Artabanus, name of a number of Persian princes, soldiers, and statesmen. The name was also borne by four Parthian kings.

One A. was a brother of Darius I., and trusted adviser of Xerxes, his nephew. Another was vizier to Xerxes, whom he murdered in 465 B.C.

A. I. (*c.* 127 B.C.) perished in battle against a Mongolian tribe.

Artabazus, the name of sev. distinguished Persians under the Achæmenidæn dynasty. An A. led the Parthians when Xerxes advanced against Greece. Another was general under the Persian King Artaxerxes II. He afterwards revolted against Artaxerxes III., but was forgiven. He was made satrap of Bactria.

Artagnan d', the hero of three of Dumas' novels, viz. *Trois Mousquetaires*, *Vingt ans après*, and *Le Vi*

comte de Bragelonne. He is drawn as a Gascon adventurer who goes to Paris to win his fortune, aided by his three friends, Athos, Porthos, and Aramis. The historical Count d'Artagnan, Charles de Batz de Castelmore (1611–73), was captain in the guards in 1654, 'sous-lieutenant' in the musketeers in 1657, 'capitaine-lieutenant' in 1667, and 'maréchal-de-camp' in 1672.

Artamenes. *Artamène, ou le grand Cyrus*, is the title of one of the novels of Madeleine de Scudery. It is in 10 vols., and appeared from 1648 to 1653. The character of Sappho, in vol. x., is autobiographical.

Artanthe elongata is a shrub of the natural order Piperaceæ, a native of Peru, remarkable for the styptic property of its leaves, which are used for staunching wounds. It is also used for other medicinal qualities.

Artaxerxes (465–424 B.C.), son of Xerxes, King of Persia. He slew his elder brother Darius on suspicion of his being guilty of the murder of his father. A. then ascended the throne in 465 B.C. In his time peace was restored between Persia and Athens after a war of fifty-one years.

Artaxerxes II., Mnemon (405–359 B.C.), King of Persia, succeeded his father Darius II. His reign is marked by the revolt of Cyrus, his younger brother, who was assisted by ten thousand Gks., and was defeated at Arnaxa in 401. The peace of Antalcidas terminated the wars with the Gks.

Artaxerxes III., or Ochus (359–338 B.C.), King of Persia, succeeded his father, A. II. He murdered two of his brothers, and afterwards put to death all the remaining branches of the family. In Egypt he slew the sacred bull Apis and gave the flesh to his soldiers. His eunuch Bagoas poisoned him, and gave his carcass to the cats.

Artaxerxes, Bebegan (223–238 A.D.) (in Persia, Ardshir), King of Persia, founder of the dynasty of the Sassanidæ, was the son of Babek and grandson of Sassan. Defeated his predecessor Artaban, the last of the Arsacidæ, and had himself proclaimed king of kings. He restored the old religion of the Magi, made new laws, provided for their administration, and for the education of the people, and then undertook to extend his dominions. War with the Roms. broke out in 232. After fighting for five years without gain for either side, peace was made.

Arteaga, Etienne, a Spanish writer and a Jesuit who *d.* at Paris in 1799. Owing to religious disturbances he went to live in Italy. He wrote Gk. and Lat. poetry, and a work on the *Revolution of the Theatre in Italy.*

Arteaga, Father Hortensio Felice Paravicino y [illegible] writer. He [illegible] and chaplain [illegible] His poems and sermons have been pub.

Arteaga y Alfaro, Matias (*d.* 1704), a Spanish painter and engraver. His pictures were mostly religious, and he was one of the founders of the Academy of Seville, his native tn. As an engraver he reproduced the works of Séal, Murillo, Herrera, and Alonzo Cano.

Artedi, Peter (1705–35), *a distinguished Swedish naturalist, was b.* at Anund in Angermanland, Sweden, and was drowned in a canal at Amsterdam. He went to the university at Upsala, where he was a fellow-student with Linnæus. He first studied philosophy and theology, but gave up these studies for medicine and natural history, especially the study of fishes. In 1734 he came to London, where he wrote the preface to his *Ichthyologia*, which work took sev. years to complete. He assisted Linnæus in his *Systema Naturæ*, and Albert Seba in his work on natural history. His works, including *Ichthyologia* and *Synonymologica*, were pub. by Linnæus in 1738.

Artemidorus: (1) Of Ephesus, a geographer who lived about 100 B.C. Studied at Alexandria and travelled much. Pub. a work on general geography as a result of his investigations. (2) A soothsayer and dream-interpreter who lived about the second century A.D., during the reigns of Hadrian and Antoninus. Called himself Daldianus. His work on interpretation of dreams is said to have been written by command of Apollo Daldianus. The work is in four books, and gives a valuable insight into ancient superstitions.

Artemis, in Grecian mythology the goddess of the moon and of hunting, called by the Romans Diana. She was the daughter of Zeus and Leto, and twin-sister and counterpart of Apollo. She was *b.* at Zelos, and is thus often called Ortygia, from the anct. name of the is. She is represented as being armed with bow and arrows, dealing out death to mortals as punishment [illegible] against herself [illegible]. She is the go[illegible] protectress of [illegible] nd defies the power of love. She slew Arion for an insult to herself, and transformed Actæon into a stag because he witnessed her bathing. (1) According to Arcadian and Athenian legend she is looked upon first and foremost as the goddess of nature. To her influence the increase of the fruit of the fields is due. She is the goddess of agriculture. She drives away the

corn-spirits, is the friend of reapers, and requires her share of the first-fruits. (2) Another view of the original character of A. is that she was the moon-goddess. This is probably due to the fact that, as Apollo was identified with the sun-god, Helios, it happened as a natural conclusion that A., his counterpart, should be identified with the moon-goddess, Selene. (3) She is also represented as goddess of the nymphs, hunting in the Arcadian mts., seated in a car drawn by four stags with golden antlers. By the Roms. A. was identified with Diana, a goddess of light, corresponding to Dianus, or Janus, a god of light, the sun. In art A. is represented as a young and beautiful huntress, modestly attired in the chlamys, with legs bare below the knees. She carries a bow and a quiver of arrows, and is attended by dogs or stags. As the moon goddess she wears a long robe; her head is covered by a veil, and above her brow is the crescent of a moon. The statue, 'Diana of Versailles,' now in the Louvre at Paris, is an artistic and ancient piece of sculpture.

Artemisia, a genus of Compositæ very common in northern countries, has many species noted for their bitterness. *A. vulgaris* and *A. campestris* are well-known British species; *A. abrotanum*, old man or southernwood, has a peculiar aromatic scent, and is found in S. Europe and the East; *A. Absinthium*, the wormwood, has valuable medical properties, and grows wild in Britain; *A. Dracunculus*, the tarragon, has succulent leaves used in vinegar, and is found in Siberia.

Artemisia: (1) Queen of Halicarnassus in Caria, one of the allies of Xerxes at the famous Battle of Salamis, 480 B.C. (2) Another Queen of Halicarnassus, wife and successor of Mausolus (352–350 B.C.). She is noted for her love to him, the extraordinary grief with which she mourned his loss, and the magnificent monument which she built to his memory. This monument, called the mausoleum, was adorned with fine Gk. sculptures, portions of which were discovered in 1857 and are now in the British Museum.

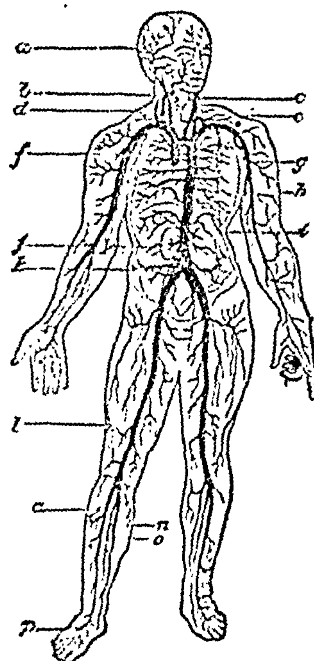
Artemisium, in anct. geography a cape of N. Eubœa, Greece, off which a famous naval battle was fought between the Gks. and the Persians in 480 B.C.

Artemus Ward, *see* Browne, C. F.

Arter (Old Fr. *artre*, a moth), a wood-worm, sometimes called art-worm.

Arteriotomy, the cutting or opening of an artery for blood-letting purposes. It is only advocated where it is required to deplete the cerebral circulation to a considerable extent, and the temporal artery or one of its divs. is always selected. When sufficient blood has been let, the artery is completely divided and the ends are ligatured.

Artery, one of the tube-like vessels through which the blood is propelled by the heart to all parts of the body. They consist of sev. coats; the outer,



ARTERIAL SYSTEM

a, temporal artery; *b*, carotid artery; *c*, vertebral artery; *d e*, subclavian artery; *f*, aorta, or great artery; *g*, axillary artery; *h*, brachial artery; *i*, celiac artery; *i*, renal artery; *k*, iliac artery; *l*, femoral artery; *m*, posterior tibial artery; *n*, anterior tibial artery; *o*, peroneal artery; *p*, pedal artery.

or *tunica adventitia*, composed of connective tissue; the *yellow elastic coat*; the *muscular coat*; the *elastic penetrated coat*, which is perforated by small apertures; and the *tunica intima*, composed of endothelial cells. The walls undergo degeneration in cases of *arterio-sclerosis*, the elastic coats are destroyed or greatly impaired, and the other walls are thickened. This loss of elasticity involves an increased resistance to the blood current, and consequently increased strain on the heart. The disease is caused by the toxins of

malaria, rheumatism, and syphilis; by chronic alcoholism and lead poisoning; by over-strain and over-eating; and as secondary to Bright's disease. The other chief affection of the arteries is *aneurism* (*q.v.*).

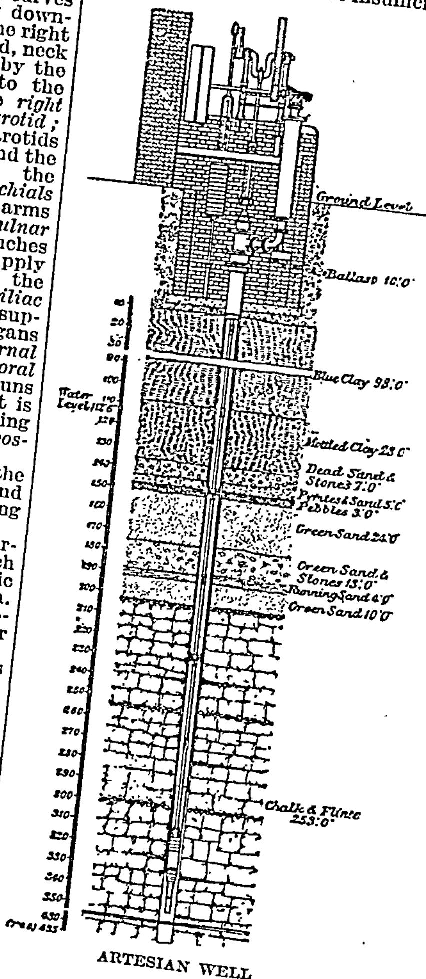
The *aorta* is a large A. rising from the left ventricle of the heart, curves round in an arch, proceeding downwards until it bifurcates into the right and left *iliac* arteries. The head, neck and upper limbs are supplied by the *innominate*, which divides into the *right common carotid* and the *right subclavian*; the *left common carotid*; and the *left subclavian*. The carotids supply the organs of the head, and the sub-clavians passing through the armpits are called *axillaries, brachials* as they pass down the upper arms bifurcating into the *radial* and *ulnar* arteries in the forearms. Branches are given off from the aorta to supply the tissues of the heart and the viscera of the abdomen. The *iliac* bifurcates into the *internal iliac*, supplying the pelvic viscera, the organs of generation, etc., and the *external iliac*, which becomes the *femoral* A. as it descends the thigh, runs to the back of the limb, where it is called the *poplitcal A.*, bifurcating into the *anterior tibial* and the *posterior tibial* As.

The *pulmonary A.* springs from the right ventricle of the heart, and bifurcates into branches for supplying the right and left lung with blood.

Artesian Wells, perpendicular borings in the ground through which water rises by natural hydrostatic pressure from water-bearing strata. The name owes its origin to the province of Artois, in France, where their use has been long established.

The strata composing the earth's crust may be divided into two classes, permeable and impermeable, according as to whether they allow water to pass through or not. Examples of the former class are sand and gravel, and of the latter, clay and hard rock. Water naturally tends to find the lowest level, therefore streams flowing over impermeable strata collect in hollows to form lakes or find their way to the sea. Suppose, however, that there is an outcrop of permeable strata lying between two impermeable layers. The water which falls on the outcrop sinks down as low as possible in the porous layer. There occurs a condition which may be illustrated by holding a basin inside a larger one with the space between the two filled with water. If the inner one is perforated at points fairly low down, the water issues with some force. Therefore, when a hole is bored through impermeable strata to the accumulation of water in the porous layer, the pressure is often sufficient to force the water to the surface, or at any rate to within pumping distance.

A. W. are of great value when the supply of surface water is insufficient.



ARTESIAN WELL

In Queensland and S. Australia the scanty rainfall is often supplemented by water drawn in this way from great depths. Water-courses that usually run dry in summer have been converted into permanent streams by the surplus from these wells, and it is estimated that the yield in Queens-

land is equivalent in irrigating effect to a yearly rainfall of 12 in. over 110,000 sq. m. The water obtained from A. W. naturally contains many mineral salts in solution, and so may be unsuitable for washing or certain manufs., but the general absence of organic impurities makes it valuable for drinking purposes. In some dists. of the Atlantic coast plain in the U.S.A., the development of A. water supply has promoted a marked improvement in public health.

Many A. W. over 300 ft. deep have been sunk in London, such as those which supply the fountains in Trafalgar Square. In the neighbourhood of Paris the borings are often much deeper. At Grenelle a well 1798 ft. deep was sunk, the operations lasting from 1834 to 1841. In America many wells are over 2000 ft. deep, and in Putman Heights, Connecticut, there is one 6004 ft. deep.

Occasionally it is found that the water from A. borings is salt or brackish, and invariably the temperature is higher than that of surface water; there appears to be a rise of 1° F. for every 55 ft. of descent down to 1800 ft., after which the rise is more rapid.

Artevelde, Jacob van (c. 1300–45), the celebrated brewer of Ghent, who became governor of Flanders. On the occasion of a revolt against Count Louis in 1338 he was chosen chief of the insurgents. He afterwards united with Edward III. against the king of France and assisted at the siege of Tournai in 1340. In the truce which followed he stipulated the independence of Flanders, and became its governor. He applied himself to his difficult task with great energy and sagacity, but after sev. years he thought it best to make Flanders into a kingdom, and offered the crown to the Prince of Wales. He was massacred in a popular tumult at Ghent.

Artevelde, Philip van (1340–82), son of the preceding, was chosen captain of people of Ghent in a revolt against Count Louis II. in 1382. Defeated Louis, took the city of Bruges, and assumed the state of sovereign. Louis after having obtained assistance from France, entered Flanders with a Fr. army led by the brave Constable de Clisson. He defeated the Flemings at the Battle of Roosebeck and slew their leader.

Arth, vil. of Schwyz, Switzerland, at the S. end of the Lake of Zug, 17 m. E. of Lucerne. It is a terminus of the Rigi Railway, and stands on the site of the Goldau landslip of 1806. Pop. 5120.

Arthrectomy (Gk. ἄρθρον, a joint, ἐκτομή, a cutting out), excision of a joint.

Arthritis, inflammation of a joint, usually due to gout or rheumatism. Rheumatic gout, or *A. deformans*, however, has probably no close connection with either gout or rheumatism. It is a chronic disease, involving changes in the cartilages, synovial membranes, etc., and generally producing great deformity in the joints. The actual cause of the disease is still a matter of doubt, but there is an increasing disposition to regard it as being of microbic origin. One joint, usually of the hand, is first affected, and then the corresponding joint on the other side. All the joints of the feet, arms, legs, and trunk may be symmetrically invaded in turn in bad cases. The course of the disease is extremely variable; it may gradually lead to total helplessness, but occasionally improvement may be expected. Although looked upon as incurable, *A. deformans* is not immediately dangerous to life.

Arthropoda (Gk. ἄρθρον, joint, πούς, foot), a zoological term applied to a group of animals with jointed limbs, including insects, spiders, and crustaceans. They are segmented animals, often bearing appendages on the segments, are bilaterally symmetrical, covered with a firm cuticle; they have foot-jaws, and the brain is connected with ganglia to the food-canal. The name has been used somewhat variously in different systems of classification, but Sir E. R. Lankester restricted it to one section of the div. *Appendiculata*, or segmented animals with a pair of lateral appendages to each ring. The appendiculata are divided into the minute animals *Rotifera*: the *Chætopoda*, or worms; and the *A.*, where the lateral segments have become specialised into jointed limbs, claws, and jaws. The A. were divided by Lankester into *Hyparthropoda*, a hypothetical group to connect the ancestral forms of A. and chætopoda; the *Protarthropoda*, including the genus *Peripatus*, found in Africa, Asia, and Australia; and the *Euarthropoda*, which include the classes *Diplopoda*, or millipedes; *Arachnida*, or spiders; *Crustacea*, as crabs, lobsters, shrimps, etc.; *Chilopoda*, or centipedes, and the *Hexapoda*, or insects.

Arthur, usually described as the hero of mythological romance, but even if the exact historic existence of A. cannot be proved, at least some of the deeds ascribed to him can be traced to historical personages. The great authority for the authenticity of an historic A. is Nennius, but, as has been pointed out, Nennius lived at least 150 years after the deeds he describes, and any mention of A. cannot be found in contemporary writers. The historic Battle of Mons

Badon, as great a battle from the point of view of the Britons as the Battle of Deorham is from the point of view of the Saxons, can at any rate be ascribed to Ambrosius Aurelianus. This battle is described by Gildas as taking place, as far as we can gather from the data given by him, about the year 516. This great battle, which beat back the W. Saxons and prevented their further advance, is ascribed by Nennius to A. Perhaps the most conclusive proof to be put forward is simply to note that Gildas, who ascribes the battle to Ambrosius, was a contemporary, whereas Nennius was not. Since also Gildas gives the name of all important British chieftains and omits that of A. we can safely conclude that A. was not a personage known to Gildas. On the other hand, Nennius, in giving his evidence, says: 'On the death of Hengist his son Octha crossed from the northern region of Britain to the kingdom of Kent. Then did A. fight against the Saxons in these days along with the leaders of the Britons, but he himself was leader in the wars.' He also gives the names of twelve great battles which A. fought, finishing up with the battle at Mons Badon. At this latter battle 960 men are given as having fallen by A.'s sword alone. In judging the authenticity of an historic A. we must bear in mind that A. is a fairly universal personage, but that all nations with which his name is closely identified are those of Brythonic origin. His name occurs in Gaelic history, in Welsh poetry, but of a very much later date than that to which the Battle of Mons Badon belongs. A theory for which much can be said is that which puts forward A. as a mythical personage whose name is introduced by the Irish monks of Columba, since we find that almost every quarter into which Irish civilisation penetrated, we have the story of A., whereas in Wales the references to A. are practically nil, and we note at the same time that the influence of the Irish was very small in Wales. Nennius, however, definitely gives us the places where these twelve battles were fought, but archæologists are still contending as to the probable sites of these battles. The site of some of them can be quite easily identified, as *e.g.* the ninth 'in Urbe Legionis,' *i.e.* Chester, and the twelfth at Mons Badon. In the eighth, which was fought 'in Casbello Guinnion,' we are told that A. carried an image of the Blessed Virgin on his shoulders, 'and the heathen were put to flight on that day, and great slaughter made of them through the merits of Our Lord Jesus Christ and through the merits of the Blessed Virgin His mother.' Whatever truth there is, however, in the story of A. must be ascribed either to the details given by Nennius or to the data given by Gildas, since much that has been written of A. is obviously the invention of a later day, and the A. of Geoffrey of Monmouth is almost as impossible historically as is the creation of the mind of Tennyson. The romance of A. developed on the lines of mediæval chivalry, and the A. of the tournaments cannot be compared with an A. fighting at Mons Badon, or, as one record describes him, beating back the armoured bands of the Roms. on the Rom. walls. It remains now simply to trace the A. as we know him in his development by the romantic writers of later centuries. From the Ambrosius of Gildas to the Artorius of Nennius is a long step, and one in which the character and exploits of A. have not suffered. But from Nennius to William of Malmesbury is a still longer step, and a step during which the character and exploits of A. are developed still more fully and become more and more painted in the light of a contemporary monarch. The A. of Gildas, if not also the A. of Nennius, must have been simply a Romanised Briton, who led his countrymen against the attacks of a common foe. But later the hand of romance is laid, and not lightly, upon the character of A., and he becomes the centre of a picture of the ideals of chivalry and romance, the perfect knight, the perfect king, the perfect lover. We find the foundations of all Arthurian legend in Geoffrey of Monmouth and later developments in the stories of Sir Thomas Malory and Lord Tennyson. In later romance he has become the beau-ideal of the true Christian knight—the knight who, accoutred in the armour of mediævalism, goes forth to conquer wrong and free the oppressed. It has already been noted that the stories of our Prince A. are universal; the best known story of how A. will come again is told by the Ger. peasantry as how Frederick Barbarossa will come again. The only conclusion that we can draw from so much contradictory evidence is that there may be an historical A., but he is certainly not the hero of romance that later ages have made him out to be. In the summer of 1930 an international conference (the first on record) of those interested in the Arthurian legends was held in Cornwall, a spot near the fabled Lyonnesse of A. *Le Morte d'Arthur* (Malory); *Poems* (containing the *Idylls of the*

King) (Tennyson); and *Two Morte d'Arthur Romances*, are included in Everyman's Library.

Arthur, Chester Alan (1830–86), the twenty-first president of the U.S.A., *b.* at Fairfield, Vermont. He graduated from Union College in 1848; practised law in New York from 1853. He became noted for eloquence in behalf of the coloured people. At the time of the Civil War he was inspector-general and Q.M.G. for the state of New York. He was a Republican and held the office of collector of the port of New York (1871–78). In 1880 he was elected vice-president, and in 1881 became president on Garfield's assassination, but was defeated by James G. Blaine in his candidature in 1884. His administration was noted for measures affecting the tariff, polygamy in Utah, the Chinese, the navy and civil service reform. *See* UNITED STATES—*History*, and Smalley, *Life of C. A. Arthur*, 1880.

Arthur, Duke or Count of Brittany (1187–1203), for whose death King John was responsible, was son and heir of Geoffrey, third son of Henry II. In order to destroy his right of succession, King John had him murdered in 1203.

Arthur, Sir George, baronet (1784–1854), lieutenant-general, youngest son of John Arthur of Norley House, Plymouth. Saw active service in Sicily and in the Walscheren expedition. In 1837 he was made lieutenant-governor of Upper Canada. In 1842 made governor of Bombay presidency.

Arthur, Julia (*b.* 1869), American actress, whose real name before she married B. P. Cheney in 1898 was Ida Lewis. She was *b.* at Hamilton, Ontario, and made her professional debut at the Prince of Wales's in *Richard III.* (1883). Her first success in New York was in *The Black Masque.* She played later in A. M. Palmer's company, and in Sir Henry Irving's company (1895). Has since played many parts.

Arthur, Timothy Shay (1809–85), American author of moral and domestic tales, especially *Ten Nights in a Bar-Room*, which had a great contemporary reputation. He founded *Arthur's Home Magazine* in 1852.

Arthur's Seat, a hill in the form of a lion, E. of Edinburgh. It is about 822 ft. high, and an unrivalled panorama can be seen from the top. The ascent is easy.

Artichoke. Both the true A. (*Cynara scolymus*) and Jerusalem A. (*Helianthus tuberosus*) are species of the Compositæ. The former grows in southern Europe, and its young flowers are edible; the latter, common in Europe and America, has tubers like those of the potato which are also a food.

Article, Indefinite, *see* A.

The definite A. 'the' is allied to the Ger. *der* and the Dutch *de.* In Lat. the indefinite A. does not exist.

Articles, The Six, popularly called 'the six-stringed whip,' is the name given to a statute passed in 1539 at the instance of Henry VIII., who was alarmed at the reforming zeal of the Eng. Protestants. These A. asserted the position of the Eng. Church on six fundamental doctrines, and were as follows: (1) belief in transubstantiation; (2) communion in both kinds not necessary; (3) celibacy for the priesthood; (4) chastity to be observed when vowed; (5) private mass permitted; and (6) auricular confession necessary. Archbishop Cranmer strongly opposed the Act when it was passing through the House of Lords, but the king overbore all opposition. The penalties for contravention of these A. were very severe, and a failure to believe in transubstantiation was punishable by burning alive. Death was also the penalty for a second offence against the other A. This severity was somewhat mitigated by an amending Act in 1544, and the A. were repealed in 1547, after Edward VI. came to the throne.

Articles, The Thirty-Nine, *see* THIRTY-NINE ARTICLES.

Articles of Association. Whenever a joint-stock company is formed a printed list of rules for its conduct must be prepared. These are its A. of A. They are signed by the subscribers to the memorandum of association, stamped, and both the A. and the memorandum must be registered by the registrar of joint-stock companies before he grants his certificate of incorporation. A copy of the A. and the memorandum must be available for each shareholder on the payment of one shilling. A model list of A. is given in schedule A of the Companies Act, 1862. These number ninety-seven, and deal with such questions as the transfer of shares, forfeiture of shares, shareholders' meetings, and the powers of directors. *See* COMPANY.

Articles of War were formerly ordinances issued by the king, or by the commander-in-chief with the king's authority, governing the conduct of a military campaign and ceasing on its conclusion. Until the passing of the first Mutiny Act (*q.v.*) in 1789 these were the only ordinances regulating the governance of troops, and in times of peace acts such as desertion or disobedience were only liable to the civil law, that is to say, they were merely breaches of con-

tract. The issuing of A. of W. was a prerogative of the Crown which was not taken away by the first Mutiny Act, but in 1803 it was superseded by statutory power to be found now in section 69 of the Army Act, 1881. This power to issue A. of W. is not now likely to be used, for the annually renewed Army Act or Mutiny Act covers the whole ground. Similar in every respect to those of the army are the naval A. of W., and like them are now embodied in a statute, the Naval Discipline Act. Special A. apply to the native troops in India.

Articulata (Lat. *articulare*, to join), an obsolete term applied by Cuvier to segmented animals, as the Crustacea, Myriapoda, Insecta, and Arachnida, now placed under the div. Arthropoda. He included the Annelida,

any sound, the tongue is adjusted with relation to the palate at the place called 'place of A.' This is where the tongue has for that sound the maximum elevation. The common use of A. and this technical use are very often used too indiscriminately even by phoneticians.

In anatomy an A. is a junction, or joint, between the bones in the skeleton of a vertebrate animal. Such a joint may be immovable, when the bones are directly united (synarthrosis); or slightly movable, when they are connected by an intervening substance (amphiarthrosis or symphysis); or more or less freely movable, when the articular surfaces are covered with smooth cartilage and surrounded by a fibrous capsule, lined with membrane, secreting a lubricating fluid called synovia (diarthrosis).

Articulator, a telephone contrivance to produce smoothness of tone; also a mounter of bones for medical study.

Artificer Engineers, a warrant rank in the British navy, open to engine-room As. of not less than eight years' service and over thirty-five years of age. A. E. are on a level with carpenters, and wear the same uniform, with a distinctive stripe of purple cloth on the cuff.

Artificers, Engine-room, a rank of petty officers in the British navy. Candidates for this position must be not less than twenty-one nor more than twenty-eight, and have had some experience in either coppersmith's work, engine-fitting, boiler-making, or general smith's work. There are four classes of engine-room As., the first, or highest, being reached after twelve years' service. A fifth class consists of boys over fifteen in training.

Artificial Flowers, *see* FLOWER.

Artificial Horizon, *see* HORIZON.

Artificial Limb, a mechanical contrivance attached to the stump of an amputated limb and designed to perform the functions as far as possible of the natural limb. An early example, exhibited in the London Royal College of Surgeons, is said to have been made *c.* 300 B.C. It is an A. leg, made with pieces of thin bronze fastened to a wooden core; the foot, which has vanished, was probably made of wood. Another A. L. of historical interest is the hand of 'Götz of the Iron Hand,' with which he was able to grasp sword or spear.

The great improvement in methods of amputation in recent years has occasioned a corresponding improvement in designs for A. Ls. The surgeon aims at leaving a stump which
...ost possible
...h will bear
...pon the use
...he arm the
...is greatest
...ne, so that
the need for a considerable amount of padding over the end of the bone is not so great as in the case of the leg. The 'modified circular' method of amputation, which leaves the cicatrix over the end of the bone, is therefore suitable, as it can be carried out comparatively close to the injured or diseased part. Disarticulation at the wrist-joint leaves a widened stump which is especially suitable for an A. attachment. Amputation through the forearm, if it does not result in the fusion of the ends of the radius and ulna, leaves the power of pronation and supination, that is, of making the movements turning the palm upwards and downwards. Amputation through the upper arm naturally leaves a stiff-arm movement from the shoulder. The simplest form of A. attachment is a wooden stump into which a knife or fork can be screwed, or a hook, as occasion requires. A hand has been devised by which a certain amount of voluntary and variable movement is imparted to the thumb by means of hydraulic power controlled by an india-rubber ball placed under the arm-pit. The thumb acts as opposed to the rest of the A. hand, and a number of varied grasping and manipulatory movements are possible.

The old method of screwing a hook into the stump of the arm has now been discarded for a spring or snap catch. The Mackay arm is a well-known modern pattern, and is made for high amputation at the shoulder and for amputation at the elbow; the hand is of rubber or wood and the remainder in light perforated

metal. Another useful pattern has a 'stirrup attachment' below the elbow into which appliances or an A. fore-arm can be inserted. Since the World War, progress has been made in A. Ls., and to-day, with the assistance of harness (usually made of webbing), it is possible for some people to accomplish with their A.Ls. almost as much as they could with their natural limbs. This advance is particularly noticeable in connection with A. hands, for which a mechanism has been invented for grasping and releasing objects by control from the shoulder. Similar progress has also been made in A. L. for the leg. An essential contributory factor to the success of an A. L. is the determination of the patient to overcome his disability.

A. attachments to the lower limbs also depend upon the extent to which the functions of the limb are impaired. Amputation of a part of the foot leaves the ankle action unrestricted, and the skin incisions are so arranged that there is no cicatrix or skin-grafting in the part walked upon. It may be generally said that the availability for A. attachments to the lower limb is best served by a 'flap' method of amputation, as the weight must be borne on the end of the bone, and such methods not only provide a sufficient 'cushion,' but can be arranged so that the cicatrix may not come in the line of greatest pressure. It was formerly the custom in amputating the lower leg to sever the tibia just below the knee, so that the A. leg received the bent knee, the stump pointing backwards. The adoption of numerous devices in which the natural action of the ankle is imitated has now led to the preservation of as much of the natural limb as possible, because the extent of curtailment of a limb determines not only the extent of functional loss, but also the amount of leverage available; and consequently the amount of effort required to use an A. L.

Artificial Respiration, the mechanical restoration of the act of breathing when it has been suspended by asphyxiation, drowning, poisoning, etc. The natural movements should be imitated as far as possible, and should be performed rhythmically about fourteen times per minute. The two most generally used methods are those of Sylvester and Marshall Hall. In the former, the body of the patient is placed upon the back, the shoulders being slightly raised. The operator grasps the arms just above the elbows, and by raising them gently and steadily to their full extent behind the head, induces inspiration. After two or three seconds they are lowered to the side of the che[st and] pressed against it, thus causin[g ex]piration. The movements, should be supplemented by fr[...] and preceded by an inversion [of the] body to drain off water, are [...] successful even after more tha[n ...] hour's apparently unsuccessful [...] In the Marshall Hall method the [...] is placed on the back with the [...] arm bent under the head. It is [...] gently rolled over on to the face, [...] tongue being held forward, and [...] back again, so that the thorax is c[om]pressed and the lungs are emp[tied] by means of the weight of the bo[dy.] This should be done every f[...] seconds. Various other systems [...] in vogue, and are of advantage [in] certain cases.

Artificial Silk, or Rayon, as it is n[ow] widely called, is prepared by vario[us] processes of treating cellulose in sol[u]tion so as to draw it out into fi[ne] threads. Cellulose, which is the bas[is] of all vegetable structure, is for pu[r]poses of A. S. obtained usually fro[m] cotton or from the wood pulp o[f] spruce trees. As far back as 1754 Réaumur, the French physicist, guessed at the possibility of imitating the product of the silkworm, but it was not until the discovery of nitro-cellulose that A. S. could be produced on an industrial scale. In 1855 Audemars of Lausanne obtained from a solution of nitro-cellulose a thread which he called A. S. and used as a filament for electric globes. From this experiment was derived the nitro-cellulose process, developed by Count Hilaire de Chardonnet in 1886, the first of the four different methods by which A. S. is prepared in industry to-day.

Chardonnet Silk.—The raw material is washed cotton. From this, nitro-cellulose (gun-cotton) is made, and then dissolved in equal parts of ether and alcohol. The viscous solution, called collodion, is forced through capillary tubes into water. The product is then dried and denitrated by treatment with an alkaline hydro-sulphide.

Despeissis Silk.—This A. S., named after M. Despeissis, who invented the cuprammonium process, has the same lustre and elasticity as Chardonnet silk. It is made by dissolving pure cotton cellulose in ammoniacal copper oxide. The dissolved cotton is then filtered and passed through to the spinnerets or capillary tubes. The resulting threads are coagulated either in acids or alkalis.

Viscose Silk.—The cellulose is obtained mostly from wood pulp and treated with caustic soda to form an alkali-cellulose. This is then united with carbon bisulphide to form a

xanthate, termed 'viscose' by its inventors, Messrs. Cross and Bevan (1892). After careful filtration the xanthate is conveyed to the thread-forming machines and coagulated by heat.

Acetate Silk, or 'celanese,' as it is called, from the product manufactured by The British Celanese, Ltd., is obtained from cotton or wood pulp treated with acetic anhydride. The cellulose acetate, thus formed, is dried and then dissolved in acetone. After filtration, the mixture is ready to be made either into 'dopes' and varnishes, such as are used for aeroplane fabrics, or into silk threads. 'Celanese' is softer than other artificial silks, and is least affected by water. This makes it suitable for fishing lines, etc. It is also used by electricians as an insulator.

The standard work on A. S. is by Foltzer, *Artificial Silk and its Manufacture*.

Artigas, Fernando José (*c.* 1755–1851), S. American soldier and politician, *b.* at Montevideo; became captain of a corps in the Spanish provincial service, but left this in 1811 for the Revolutionary army. Later he joined the Republican army, but was outlawed by the commander, Sarratea, for independent action. He then organised a troop of gauchos, and was so successful that he was recognised as an independent chief and given the whole of Uruguay in 1814. He expelled the Portuguese from Montevideo and became dictator, but was ultimately defeated, and in 1820 fled to Paraguay, from where he was sent into exile in Candelaria.

Artigny, Antoine Gachet d' (1704–78), a Fr. writer. His two prin. works are *Relation d'une assemblée tenue au bas du Parnasse pour la réforme des belles-lettres*, and *Nouveaux Mémoires d'Histoire, de critique et de littérature*, 1749–56.

Artillery (from O. Fr. *artillerie*; It. *artiglieria*; Sp. *artilleria*). Its former meaning comprised all implements of war, and was generally used in the plural. Then the word was used particularly to denote engines for discharging missiles, as catapults, bows, crossbows, and slings. In modern use the word denotes: (1) all firearms discharged from carriages in contradistinction to small arms; (2) the particular troops engaged in the service of such firearms; (3) the science which treats of the use and management of ordnance.

Early history.—In the O.T. 'engines invented by cunning men to shoot arrows and great stones' are mentioned. Continual improvements were made, and under the names catapulta, balister, trébuchet, such arms were used in mediæval warfare. A small piece of cannon was contrived by Schwartz, a Ger. cordelier, soon after the invention of gunpowder in 1330. But even on the discovery of gunpowder these weapons were not readily displaced. The first occasion at which guns were used was probably at the siege of Avidale in Italy, when the Gers. employed one piece. It is also said that the Moors of Algeciras also used A. in Spain in 1343. According to some historians, guns were used at Crécy in 1346, when Edward III. used four pieces of cannon. The Eng. also used A. at the siege of Calais in 1347. The Venetians employed A. against the Genoese in 1377. At the siege of Harfleur (1415), twenty-five 'master gunners' and fifty 'serviteur gunners' were employed. A 'gunner' of that time had charge of all guns and stores, and laid and fired the cannon in action.

Beginnings of field artillery.—In the early stages of its history A. was chiefly used as battering-rams, and did not come into general use until late in the fifteenth century. The 'Wagenburg,' denoting a cart armed with guns, came into prominence in the Hussite wars of 1419–24. Small guns were used in 1460 to clear the streets during fighting in London, and heavy ordnance to batter the walls. The greatest example of A. work in the fifteenth century was the siege of Constantinople in 1453, when the Turks used a large force of A. Sev. pieces used at the siege survived until the eighteenth century. These pieces were chiefly used for siege purposes and were highly effective. Many of the barons' castles were destroyed, and a prince who possessed such pieces had no difficulty in overcoming an adversary whose force lacked A.

Middle Ages.—In the wars waged by Charles VIII., Louis XII., and Francis I. of France, in Italy, A. played a most conspicuous part in siege and field warfare; *e.g.* at Ravenna (1512) and Marignan (1515) great execution was made. Nevertheless when the arquebus and other small arms became efficient very little was heard of the field A. The efficiency of the Eng. [illegible] ies for [illegible] Dur- [illegible] were used as heavy pieces, and sakers and galcons as lighter pieces. A great Turkish gun carrying 600 lb. shot was used at the siege of Constantinople.

During the Eng. civil war guns were in use. Cromwell in his sieges made great use of shells. Before his changes in the position of the A. the pieces were placed in the front of the force. He relegated the heavy pieces to the rear.

the whole equipment is carried on the backs of mules and other animals. For action the loads are lifted off and 'assembled.'

of artillery.— the exception regiments and brigades of Great Brit A. still com of the arm, Horse, Royal Field, and Royal Garrison A. To each are added the Special Reserve and Territorial A. In Great Britain the administrative and tactical unit is the brigade. Provision is also made for control of *matériel.* The unit mentioned above consists, in case of guns, of 3 batteries (18 guns); in the case of howitzers, of 2 batteries (12 howitzers); and in the Horse A. of 2 batteries (12 guns), and is commanded by a lieutenant-colonel.

The Honourable Artillery Company of London.—The company incorporated by Henry VIII. for military exercise and better defence of the realm, wit 25, 1537. ground, B prior of St. Mary's Convent, Spittle. The ground was afterwards known as the old A. ground. Obtained lease of the 'new' A. ground, Finsbury, their present headquarters, 1641. In the civil war, 1642–8, the company as a body took no part, but most of the members of the trained bands were also members of the company. In 1660 James, Duke of York, afterwards James II., was appointed captain-general. The company was ordered to take precedence next after the regular troops on June 1, 1883. The company numbered 1200 in 1803 and 800 in 1861. Since 1842 the officers have be e crown. On the of Sussex in 1843. became In 1863, he was of Wales. In 1887 the company celebrated its 350th anniversary by a grand review.

On the annual general court, officers and others declining to vote £500 for the payment of Colonel Borton, the adjutant, and other expenses, the Prince of Wales, the captain-general, resigned, and the company was disarmed by the War Office in 1888. In the next year drilling was resumed. In 1889 the company was reorganised as an independent force of 2000 men by royal warrant.

The Ancient and Honourable Artillery Company of Massachusetts, U.S.A., which was founded in 1638 by Robert Kayne, who with some other members pany had emig still maintains the elder company. About 200 members of the corps visited London in 1896, and were received by the queen at Windsor.

National Volunteer Artillery Association held its first meeting for shooting for prizes, given by the queen and others, at Shoeburyness, July 1865. Meetings were held and prizes distributed in 1866, but no meetings were held during the S. African War nor during the Great War.

Royal Artillery Institution, estab. at Woolwich, proposed by Lieutenants Eardley-Wilmot and J. F. Leffroy in 1838, approved in June of the same year.

The alleged great deficiency of A. in the British army was much discussed in 1870. At the A. camp at Aldershot the efficiency was reported to be very fine. In 1877 a new organisation of A. was proposed. Great improvement was made in field guns, and impulse given to the subject by the war in S. Africa, 1899–1903. In 1903 the Gun Committee adopted a new type of field gun, a 15-pounder quick-firer with effective shrapnel range of 6500 yds. and further range of 10,000 yds. It was, however, to be learned by bitter experience in the opening months of the Great War, how inadequate British 4-in. field guns were for modern warfare (consult the despatches of General (later Field-Marshal Earl Ypres) Sir John French, 1914).

Development in the Great War.—Four years of scientific warfare in the Great War saw a con gressive development in the power and influence of A., both in the actual fighting battle and in all the stages which lead up to it. Despite the handicap under which Great Britain started the War, British A. played a large part in that development, and in the later years dominated the enemy's A. tc degree, and the upon the moral and the enemy's troops could scarcely be exaggerated. (See Field-Marshal Haig's Despatch, Dec. 21, 1918.)

Ever-increasing demands for guns were made in the first two years of the war. These could not be met at once. Existing machinery had to be adapted to enable technical improvements in A. to be effected. Firing tests and travelling trials had then to be carried out before new guns were ready. The history of the war proved that improvised A. material was never satisfactory. The only modern heavy howitzer available to

the British Army in 1914 was the 9·2-in. Mark I. Howitzer, a weapon designed and constructed under the guidance of Major-General Sir Stanley von Donop. When in 1916 General Haig was calling for ever more guns, he selected the latest 'Marks' of existing models in order to facilitate construction and ensure uniformity in design. At the same time, the Commander-in-Chief insisted that every effort should be made to increase the range and accuracy of guns and that there should be no cessation of research and no finality of design.

The two main principles on which the construction programme was based were to give a decisive fighting superiority per div. over the Ger. A., and to use heavy guns only for work that heavy howitzers could not do. The preference for the howitzer over the gun was justified. Its 'life' is greater, *e.g.* for a 6-in. gun, Mark VII, the 'life' is 1500 rounds, for a 6-in howitzer, 10,000 rounds. The howitzer, too, is much easier to place in position in the field, and many can be sited in a comparatively restricted area, owing to the higher line of departure of the shell. Though they have less range than guns of a similar shell-power, howitzers are more mobile and, fired at horizontal ranges, their accuracy is greater.

The continuous A. battle which began on the Somme in 1918 and ended in the smothering of the Ger. guns would have been impossible if the proportion of medium and heavy howitzers to heavy guns had not been large—nearly 70 per cent. to 30. In 1914 there were in the original Brit. Exped. Force 486 guns and howitzers, twenty-four of which were of medium calibre; at the Armistice there were 6437 guns and howitzers of all kinds (excluding anti-aircraft A., and trench mortars), of which 2211 were medium and heavy A. To accomplish the two-fold purpose of destroying the enemy and protecting its own armies, under such conditions as obtained on the Western Front, A. batteries must cover the infantry in attack by 'barrage' fire; dominate the enemy's A., by unremitting counter-battery work; and delay and hamper the enemy's movements in rear by harassing day and night fire on his roads. The Ger. A. comprised only a few howitzers of 16½ in. calibre. The Fr. field gun was the famous 75 mm. quick-firing gun, with the recoil controlled by compressed air. It was used with deadly results in the defence of Verdun and indeed played almost the dominating rôle in the first two years of the war.

In France, after the Battle of Ypres, 1914, the Gers. held all the high ground N. of the Allied front. The power of observation therefore lay with the Ger. A. and the British gunner, but for the help of airmen and the Survey Sections, who supplied specially mounted maps, would have shot 'blind.' Science played its part in ensuring the correct height of burst of the shrapnel shell. The barometer and thermometer were a valuable part of A. stores, and for night-firing, electric lights were supplied for the aiming posts to make certain of the gun being on the correct line. Accuracy of fire was further secured to the field A. by the establishment of calibration sections; *i.e.* by firing through screens, the exact initial velocity of every gun could be estimated. The result of this scientific progress was that in the Cambrai Battle (*q.v.*) (1917) registration was dispensed with, so that surprise was possible. This element of surprise reached its acme in the Battle of Amiens (1918) when over 2000 British guns opened fire from their attack positions for the first time on the actual morning of assault. Counter-battery work became an exact science through the progress made in aerial photography and observation, sound-ranging, flash-spotting and air-burst ranging. In every British gunner officer in France was a reconnaissance officer, whose duty was to keep track of each enemy gun and to have photographed the slightest alteration in the terrain on his front. The later technical improvements in A. design included long-range modern 6-in., 8-in., 9·2-in., and 12-in. howitzers, 6-in. Mark XIX guns on field carriages and 9·2-in. Mark XIII, 12-in. and 14-in. guns on railway mountings. Other improvements were instantaneous fuses, gas and smoke shells, stream-line shells, incendiary and star shells. What developments the future may bring no one can foretell. Experts think that the gun-howitzer is the weapon of the next war; that is, a weapon longer than a howitzer but shorter than a gun, with some of the advantages of both. All A. weapons must in a future war be able to put up an air barrage against attacking aeroplanes, and hence construction must allow for a very high angle of elevation. (General Sir Noel Birch, K.C.M.G. in *The Army Quarterly*, October 1920.)

Artiodactyla (Gk. ἄρτιος, pair, δάκτυλος, finger), a sub-order of placental mammals forming part of the order Ungulata. The Ungulata are characterised by a hoof-like covering to the toes, and molar teeth with broad crowns suitable for crushing

vegetable food. The sub-order A. are distinguished by possessing pairs of symmetrically arranged toes, giving the characteristic appearance of a cloven hoof. The sub-order comprises the following groups: (1) *Pecora*, including giraffe, okapi, deer, oxen, sheep, goats, antelopes, etc., characterised by horns or antlers, two or four teats, four cavities in the stomach, and no upper incisors; (2) *Tylopoda*, including camels and llamas, characterised by absence of horns, few teats, one pair of upper incisors, and a cushion-like pad on the foot to bear the weight of the body; (3) *Tragulina*, the chevrotains, or mouse-deer, characterised by absence of horns, no upper incisors, four complete toes on each foot, and three stomach cavities; (4) *Anoplotherina*, comprising extinct species with complete series of teeth and a general resemblance to carnivorous animals; and (5) *Suina*, or pigs, including Old World pigs, American peccaries, and hippopotamus, and characterised by at least one pair of upper incisors, the cheek-teeth prominent, a cæcum in pigs, but not in the hippopotamus.

Artisans' Dwellings, *see* HOUSING.

Artlett, Richard Austin (1807–73), Eng. engraver. Pupil of Robert Cooper and James Thomson. He engraved sev. figure-subjects and portraits, but was best in reproductions of sculpture. Among his plates in the *Art Journal* are engravings of Birch's 'The Fawn,' Carrier-Belleuse's 'The Virgin Mother,' Jerichau's 'The Leopard Hunter,' MacDowell's 'The Day Dream,' Monti's 'The Veiled Vestal,' Thomas's 'Boadicea,' Foley's 'Viscount Hardinge' and 'Asia,' Crittenden's 'Christ giving Sight to the Blind lan,' and Durham's 'Perdita and lorizel' and 'The Siren and the rowned Leander.'

Artocarpus, a genus of the Moraceæ hich grow in Asia. *A. incisa* is the ead-fruit tree common to the South a Islands; it has a spurious fruit lled a *sorosis* (*cf.* pine-apple), which roasted and eaten as bread. *A. egrifolia*, the Jack tree, has a ckly fruit which is not so wholee as that of *A. incisa*. *A. chapa* and *A. hirsuta* make good per.

rtois, a prov. in the N. of France, uered by the Franks in the fifth ury. It was given as a dowry by les the Bold to his daughter h. In 1237 it was made a county uis IX. It passed into the hands anders and Burgundy, but was to France in 1659. Louis XV. d his grandson Count of A., ecame king as Charles X., 1824. amous for its artesian wells.

In the Great War the first hea fighting in the A. region was in 19 when the Fr. and British in co-ope tion delivered a general attack beg ning on September 25, a few miles the N. of Arras, there being simu taneously an attack by Gener Castelnau in the Champagne betwee Rheims and Verdun. The openin stages of the A. advance were crowne with success, of a kind which in these earlier years of the war raised illusory hopes of the dawn of ultimate victory. Fr. troops under General D'Urbal took Souchez and the foot of the famous ridge overlooking the little town of Vimy, while the forces of Sir John French carried the enemy's first and most powerful line of entrenchments, extending from W. of the mining town of Lens to a point near the notorious Hohenzollern redoubt, covering a front of some 4 miles. Much had been hoped from the activity in British munitions factories, and this activity now bore fruit in the storming of an extremely strong position consisting of a double line of field-works punctuated with large redoubts and strengthened with bomb-proof shelters and a maze of well-organised trenches. Loos fell to the British, who pressed on to the outskirts of Hulluch near La Bassée. On the reduction of the Ger. second line the dominating position known as Hill Seventy, beyond and to the E. of Loos, was captured and a position rapidly consolidated whence it was hoped soon to overcome the third and last line of the enemy. Some considerable success had, at the same time, attended the Fr. onslaught in the Champagne; but thereafter the Allied attacks fell away. The important strategic objectives in A. were the railway connections at Lens and at Somme-Py in Champagne, but the Allied advance had spent itself, and it soon became clear to the popular mind in England that some much greater effort in the production of material would be required before any further effort on a big scale could be made with any reasonable hope of success. (*See also* ARRAS, BATTLE OF; LOOS, BATTLE OF.)

In 1916 the Gers. delivered a local attack on Vimy Ridge in May, but the battle of that name was fought between the 9th and 11th of April, 1917, when gallant Canadian troops were conspicuous in the attack. In the same year was fought the Battle of Hill Seventy, between the 15th and 25th August, in the Souchez riv. dist. from Lens to Angres. In 1918 there were heavy engagements in the course of the Second Battles of Arras (Aug. to Oct.) during the successful operations for the breaking of the

Hindenburg Line. In the final advance, the last fighting in A. was approximately on 17 October, when Douai fell to the Allies.

Artom, Isaac (1829–1900), an Italian diplomatist and author, *b.* at Asti. He became secretary to Cavour, and during the Franco-German War, 1870, he made a secret mission to Vienna. In 1877 he was made senator. Besides poetry he wrote in French with Albert Blanc an account of the parliamentary work of Cavour.

Artophorion, the pyx used in the Gk. Church. See Neale's *History of the Eastern Church*.

Artot, Alexander Joseph Montagney (1815–45), a Belgian violinist, who was *b.* at Brussels and *d.* at Ville d'Avray. When quite a child he showed extraordinary skill, and was taken to Paris, where he was the pupil of Rodolph Kreutzer. He became a celebrated player, and was also known as a composer.

Artot, Marguerite Joséphine Désirée Montagney (1835–1907), a celebrated Belgian singer. She first sang at concerts at Brussels, and then, on the recommendation of Meyerbeer, she went to Paris, and made her début in *The Prophet*. She afterwards went to Italy and to Berlin, where she took part in Ger. and Italian operas. She was married to Padilla, the famous Spanish singer.

Arts, Degrees in, *see* DEGREES.

Arts, Fine, *see* FINE ARTS.

Artveldt, Andries van (1590–1652), a Flemish painter, who worked for sev. years at Genoa. His pictures were mostly landscapes and seascapes. His portrait was painted by Van Dyck.

Artvin, a tn. in Armenia, on the R. Charuch, is 34 m. S. of the oil-port of Batum on the Caspian Sea. It has a pop. of about 8000.

Aru, a group of islands in the Dutch East Indies off the S.W. of New Guinea. Total area 3244 sq. m. The Is. are low and swampy, and the coasts are fringed with coral reefs. The vegetation is luxuriant. The natives are Papuans of mixed blood, and resemble the Melanesians of New Guinea. The Is. are governed by rajahs, and there is a Dutch representative called a 'posthouder.' There are Christian churches and Mohammedan mosques. The natives barter for tortoise-shell, pearls, pearl-shells, and trepang. Pop. about 22,000.

Aruba Island, one of the Dutch Antilles, near coast of Venezuela. Area 64 sq. m. Chief town, Fort Zoutman. Pop. 9349.

Arum, a genus of the Araceæ, is a curiously-shaped plant which grows in Europe. *A. maculatum* is the cuckoo-pint, or lords and ladies, found in woods and hedges of Britain.

Arun, River, rises in St. Leonard's Forest, flows W. and then S. through Sussex, past Arundel to Littlehampton on the coast. It is 40 m. long, and is navigable for a part of its course.

Arundel, an anct. municipal bor. of Sussex, on the Arun. The castle was built by Saxons in the year 800. The Duke of Norfolk enjoys the earldom of A. as a feudal honour, by inheritance and possession of the castle without any other creation. Anct. seat of Fitzalans and Howards. There is a Rom. Catholic church erected by the Duke of Norfolk. Pop. 2742.

Arundel, Earls of. The earldom of A. has been held chiefly by the families of Fitzalan and Howard, and their descendants.

Richard Fitzalan (1267–1302), Earl of A., son of John, Lord of A. (1246–72). Richard was called Earl of A. *c.* 1289. He fought for Edward I. in France and Scotland.

Edmund, successor of Richard (1285–1326), married Alice, sister of Earl de Warenne; enemy of Piers Gaveston; declined to march with Edward II. to Bannockburn. In 1321 became connected with the Dispensers and sided with the king. Executed at Hereford by partisans of Queen Isabella.

Richard, son of Edmund (1307–76), soldier and faithful servant of Edward III. Present at Sluys and siege of Tournai, 1340. Led an Eng. div. at Crécy, and was present at the siege of Calais. Inherited estates of his uncle John, Earl de Warenne, and assumed the title of Earl of Surrey. Regent of England 1355.

Henry Fitzalan, twelfth Earl of A. (1517–80), son of William, eleventh Earl of A. Attended King Henry to Calais; made deputy of Calais, 1532. Commanded Eng. expedition to France and took Boulogne. Made lord chamberlain. Imprisoned in Tower in 1551 for being implicated in Somerset's plot against Northumberland. On Edward's death Henry joined Northumberland, though secretly in alliance with Mary. In Northumberland's absence he denounced him and proclaimed Mary as queen. Made privy councillor and lord-steward. He was engaged in intrigues to set Lady Jane Grey on the throne, and was arrested on exposure of the Ridolfi Plot in Elizabeth's reign.

Arundel, Thomas (1353–1414), Archbishop of Canterbury, son of Earl of A. Made Bishop of Ely when he was twenty-two, and lord chancellor ten years later. Made Arch-

bishop of York in 1386, and Archbishop of Canterbury, 1396. In the next year he was banished for high treason. He promoted the elevation of Henry IV., and on his succession he was restored to his see. He persecuted the followers of Wickliffe, prohibited translation and reading of the Bible, and helped to procure the statute, '*De Heretico Comburendo*.'

Arundel Marbles, part of a collection of a 'ased by Thomas . in 1624. The gen is the 'Parian Chronicle,' consisting of fragments of a marble inscription supposed to have been executed in the is. of Paros, c. 263 B.C. In its complete state the inscription recounts, in chronological order, the chief events in Grecian history from 1582 to 264 B.C.

Arundo, a genus of plants of the Gramineæ which grow in Europe, Asia, and Africa. *A. donax* is our largest cultivated grass, which grows to 10 ft. in height; the stems are made into fishing-rods. *A. phragmites*, or *P. communis*, is the common reed.

Aruspex, *see* HARUSPICES.

Aruwimi, a trib. of the Congo. It was explored by Stanley for 100 m. in 1883, and by its means Stanley advanced to help Emin Pasha in 1887. It is maintained by some to be the lower course of Schweinfurth's Welle.

Arva, a co. in Czecho-Slovakia. It is very mountainous and has extensive forests; and is watered by the White A. and the Black A., which unite and flow into the Waag. Area about 800 sq. m. Pop. 85,000.

Arvad, an anct. Phœnician city. It occupies a very small is., 2 m. from the coast, near the mouth of the R. Eleutherus. It is said to have been founded by Sidonians. The inhab. are skilled in all matters of seamanship.

Arval Brethren, or *Fratres Arvales*, consisted of a college of twelve priests in Rome. They made yearly offerings to the field Lares for increase in the fruits of the field. Romulus is supposed to have been the founder. It has been suggested by Niebuhr that this college was originally connected with the Lat. element of the Rom. state. The sister college was known as Sodales Titii. The badge of office, which was of lifelong duration, was a chaplet of ears of corn worn on the head with a white band. The prin. festival was held for three days in May, when honour was paid to Dea Dia. The latter *is* supposed to be Ceres, and is presented in an inscription written in the first year of the Emperor Elagabalus, A.D. 218.

Arve, a very rapid mt. stream which rises in the Col de Balme in the mts. of Savoy, flows through the valley of Chamouni, and joins the Rhone near Geneva. Its length is 60 m., and it obtains its waters from the glaciers of the chain of Mont Blanc.

Averni, name of anct. Gaulish tribe in the Auvergne mts. in France, where the name still exists. The tribe resisted Cæsar longer than other tribes of Gaul. They adopted Rom. civilisation readily after Cæsar's triumph. During excavations a part of the temple of their 'god of the mountain' was unearthed.

Arvers, Alexis-Felix (1806–50), a Fr. poet and dramatic writer. His first work was entitled *Mes Heures Perdues*, 1833, a collection of poems, which earned for him the reputation of a poet. His dramatic works consisted of *En Attendant*, with Bayard and P. Foucher, 1835; *Deux Maîtresses*, with Scribe, 1836; *Les Dames patronnesses*, with Scribe, 1837; *Rose et Blanche*, 1837; *La Course au clocher*, 1839; *Le Beau Martial*, 1839; *Les Anglais en Voyage*, 1844; and *Suzon et Suzanne*, 1850.

Arveyron, a trib. of the Arva in Savoy. It is an outlet of the Mer de Glace in Chamouni valley. It issues thence through a wonderful grotto of ice, known as the 'Ice gates of A.' The course is short and joins the Arve on the right bank.

Arvicola (Lat. *arvum*, field, *colere* to inhabit), or *Microtus*, the generic name of the voles, near relatives of the mice and rats. It belongs to the order Rodentia and family Muridæ.

Arya Samaj, a society, founded by Dayānanda Sarasvati (*d.* 1882), who regard the Vedas as inspired. It is now mostly a political body, aiming at the self-government of India, and determined to drive out the foreigner. It is connected with the Brahma Samaj, the 'Society of God,' the name given to the most remarkable modern religious revival in India. This society was founded by one Rajaram Mohun Roy, who was *b.* in 1774. He had studied Hinduism at Benares, and Buddhism at Tibet. At length, *c.* 1830, he founded the society known as the Brahma Samaj. The ideal of this society was, whilst denouncing 'sati' and idol-worship, to establish an eclectic system of practical morality, and to bring back into favour an ideal Brahmanism ... orship of a ... ce of the

1842, the movement became known as the Adi Samaj, or 'New Society.' Debendra Nath Tagore followed

Rajaram Mohun Roy, and was in turn followed by Keshub Chandra Sen, from 1838 to 1884. The latter completely changed the character of the movement, substituting God the Father for the Vedic deity, and as a consequence alienated many of his adherents. He lost many more by allowing his daughter to marry the Maharajah of Kuch Behar when she was only fourteen years of age. His followers went over to the Sadharana Brahma Samaj, or General Society of God. Allied to this movement may be mentioned the Prarthana Samaj, or Prayer Society.

Aryan (race and language) or **Arian** (from Lat. *Arianus*, belonging to Aria, the eastern part of ancient Persia). The name is now used commonly for the Indo-European races, and was originally given to the Sanskrit-speaking immigrants who came from India, and was also adopted by the ancient Persians.

It is universally maintained that about three or four thousand years ago there lived a tribe or tribes of the same race, in some part between the Hindu-Kush Mts. and the Caspian Sea, who called themselves As. Although no written testaments of these As. are in existence, yet the character and habits of these people have been inferred from facts revealed by philological research. Thus experts in the science of language inform us that the As. lived in tns., kept cattle, ploughed the ground, used metals, made boats, could count up to a hundred, recognised family relations, and had various names for God. The line of argument adopted y these experts is this: If, they say, e find the same word to express sheep,' 'plough,' 'horse' existing nder various disguises in a number different languages, then the tribe om which these races sprung must ve had a word to express 'sheep,' lough,' 'horse,' and if they had the me, then they must have been acinted with the thing. Language ps us again in fixing the original ne of the early As. From the A. nes for certain plants and animals nfer that the As. had their homes ose dists. where those plants and nals would exist.

me of the A. languages are more ly connected than others. The closely allied languages are ged in classes known as stocks. tock is further sub-divided into s known as branches. If we take vn language as an example, we find that it belongs to the nic stock. Many other lan- also belong to this stock, some ch resemble Eng. more closely thers. Dutch, Flemish, Ger., Norwegian, Swedish, Dan. are Teutonic languages, but they fall different groups. Eng., Dutch, a Flemish are Low Ger. languag When the terms 'Low' and 'Hig are used with regard to a langua they signify that the people of who they are used lived on the lowlan near the coast, or on the high ground of the interior. Modern Ge is a High Ger. language. Again, th languages of Iceland, Norway, Sweden, and Denmark form a third grou called the Scandinavian group. Thu the Teutonic stock is sub-divided into three branches, viz. Low Ger., High Ger., and Scandinavian. If we were to give Eng. its full designation, we should say that it is a member of the Low Ger. branch of the Teutonic stock of the A. or Indo-European family of languages. Another stock is the Romanic or Italic. Lat., It., Fr., and Spanish belong to this. They are known as Romanic languages, because they come from a Rom. source. Then, again, there is the Hellenic or Grecian stock, which is represented by modern Gk. The Keltic stock has a particular interest for us, because the inhab. of our is. before the arrival of the Saxons were known as Kelts. Keltic dialects are spoken now in parts of Great Britain and Ireland. The Keltic stock falls into two branches, Cymric and Gaelic. Under the former head are placed the Welsh language and the Armorican, a dialect of Brittany. The old Cornish, which existed until the eighteenth century, also belonged to the same branch. To the Gaelic group belong native Irish or Erse, the Scottish Gaelic of the Highlands, and the Manx of the Isle of Man. The language brought to this is. by Eng. forefathers in the fifth and sixth centuries was a pure Teutonic speech, and it continued to remain pure for a long time. The influx of foreign words into our language was slow at first. On the other hand, although modern Eng. is essentially a Teutonic language, it contains a large Italic element, has received considerable additions to its vocabulary from the Hellenic source, and possesses also many Keltic ingredients. Thus four different stocks have contributed to its formation.

Two groups of stocks remain to complete the European members of the A. family. These are the Slavonic, of which *Russian* is an important example, and Lettish, which is represented at the present time by dialects in E. Prussia.

As the name Indo-European implies, some of the languages of Asia belong to this family. These fall into two groups. One group is the Indian,

which includes Sanskrit, a dead language having important literature; the modern dialects of India which came from Sanskrit, such as Hindu-

Cingalese, the

other group is

Thus the A.

family is subdivided into eight stocks, two of them Indian and the other six European.

The word 'Indo-European' does not include *all* the languages of Europe or *all* the languages of India, *e.g.* the following European languages are not members of the A. or Indo-

rkish, Hun-

he language

the Basque

language spoken in the Pyrenees.

Arzamas, a tn. in Russia in the gov. of Nizhniy-Novgorod, on the Tesha R. It is an important centre of trade, and has soap, oil, and dye works, flour mills, and tanneries. Pop. 11,000.

Arzan (*d.* 459), an Armenian author who trans. the works of St. Athanasius into Armenian, and wrote treatises against idolatry.

Arzan (*d.* 302), a pagan pontiff of Armenia, who opposed the introduction of Christianity into Armenia by St. Gregory.

Arzano, commune of Italy, 3 m. N. of Naples, containing some beautiful villas. Pop. 8212.

Arzeu, Algerian seaport between Oran and Mostaganem. Has exports of salt and esparto grass. Near A. are the Kleber marble quarries, and the remains of the ancient town of *Arsenaria*. Pop. about 6000.

Arzignano, tn., Northern Italy, 11 m. S.W. of Vicenza. Has manufs. of silk and thread, and produces wine and oil. Pop. 5014; com. 10,953.

Arzobispo, Yslas del, *see* BONIN ISLANDS.

As, this Rom. term had a threefold meaning. It denoted (1) a weight of 12 ounces to the *libra* or

oin, varying in

eriods from 12

half an ounce;

(3) a measure equivalent to a linear foot or square acre.

Asa (956–916 B.C.), third king of Judah, succeeded his father Abijah. He adopted stringent measures to cast out idolatry from his kingdom, and was a successful warrior, repulsing the Egyptians; and in alliance with Benhadad, King of Syria, defeating Baasha, the Israelite king. See 1 Kings xv.; 2 Chron. xiv.–xvi.

Asa dulcis, a synonym of benzoin, is a drug made from the balsamic resin of *Styrax* t of the

soothing

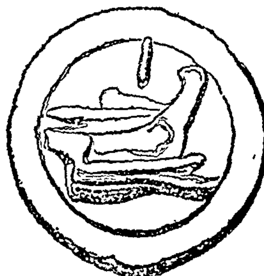
cases of

the skin.

Asad (1715-80), a Persian captain, was *b.* near Kabul. He was one of the lieutenants of Nadir Shah, and governor of one of the provs. of Persia. He afterwards became one of the counsellors of Mohammed Hassan, against whom he had previously waged war.

Asafœtida, a gum resin obtained from the root of *Ferula fœtida*. The active principle is an ethereal oil, allyl sulphide. It acts as a stimulating expectorant, and is used in





AS

bronchial affections. It is employed, often with remarkable effect, in hysterical ailments, possibly controlling the erratic nervous phenomena by the moral influence of its disgusting smell.

Asam, *see* ASSAM.

Asam was the name of a family of Ger. artists, the principal members of which were: (1) Hans George (*d.* 1696), whose work consisted of frescoes and oil paintings. (2) Cosmo Damian (1686–1742), a painter, and Ægidius Quirinus (*d.* 1746), a sculptor, were both sons of Hans George. They worked together at the churches of Innsbruck, Munich, Schleissheim, and Mannheim. (3) Cosmo Damian had two sons, Franz Erasmus (1720–94), and Engelbrecht, both painters.

Asaph, Heb. musician of the times of David and Solomon (1 Chron. xvi. 5). He was the chief of the Levites

appointed by David to minister before the Ark and offer up praise and thanksgiving (1 Chron. xxv. 1), and is regarded as the founder of the 'Sons of Asaph,' a guild of singers in the Second Temple (Neh. vii. 44). Psalms 50 and 73–83 have his name at the head.

Asaph, St., is a Welsh tn. and parish in Flintshire and Denbighshire, 5 m. N. by W. of Denbigh, situated on an eminence between the Clwyd and the Elwy rivs. The tn. and diocese take their name from St. A., the successor of Kentigern, who is said to have founded the see about 560. There are still a few parts of the cathedral dating from the thirteenth century, but most of it belongs to the fifteenth century. It was restored under the direction of the late Sir Gilbert Scott. Apart from the cathedral there is not much of note in the tn.; market day is on Friday, and cattle sales are held on the last Thursday of each month. The area of the parish is 11,346 ac. Pop. about 3500.

Asaph, St. (*d. c.* 596), sometimes called Asaaf, Assa, or Asa, a Welsh saint of the sixth century, was the grandson of Pabo. He became head of the monatery at the confluence of the Rs. Clwyd and Elwy, succeeding St. Kentigern. It is most probable that he was the first bishop of the see of Llanelwy, which was afterwards known as St. Asaph.

Asaphus (Brongniart), a genus of fossil Crustacea (Trilobites), most abundant in the lower Palæozoic strata. *A. Buchii* marks the Cambrian or lower Silurian beds, and *A. caudatus* the upper Silurian beds.

Asar, or Œsar, the Swedish name for the long, winding ridges of gravel and sand found in the low-lying parts of Sweden. These ridges sometimes extend for more than 100 m., one main ridge being joined by many tributary ridges. The appearance hat these have to a riv. delta has given rise to the belief that the deposits were formed by streams underneath the ice-sheets which covered weden during the Glacial Period, and hat the direction of the ridges may nark the site of sub-glacial rivs. imilar ridges of gravel and sand are und in Ireland, where they are lled eskers, and in Scotland, where e name kames is given to them, and the northern states of N. America. so a Persian gold coin worth about 8*d*.

Asarin, or Asarone, a preparation n the plant *Asar Europe*, smelling camphor.

sbon, *see* AIR.

sbestos (Gk., unquenchable), the e applied to varieties of fibrous erals which offer great resistance to heat through their uninflam bility and poor conductivity. fibres can be woven in cloth, w was used by the ancts. to enclose bodies when placed on the fun pyre, so that the ashes might be tained. The varieties used in man are obtained from chrysolite, a vari of serpentine; and from tremolite actinolite, varieties of amphib The chrysolite A. is yellowish colour and is extensively worked the prov. of Quebec, Canada. Amp bole A. is usually white, grey, or bl and is worked in Corsica, Hungar Russia, Griqualand W., New S. Wal and Cyprus (export increased fro £25,000 in 1919 to £292,000 in 1929 The crude A. is crushed betwee rollers with a double movement, s that the fibres are well divided; an then screened.

A. is a poor conductor of heat and electricity, resists the action of many acids, and is incombustible. It may be woven into fabrics, which have been used for firemen's clothing and furnace-men's gloves. Made into felt, it is used for fireproof walls, floors, and roofs. Packing made of A. is used for covering steam-pipes and boilers, fireproof safes, and in the construction of safety curtains for the stages of theatres and music-halls. A. paint is used for covering woodwork in order to make it uninflammable, and A. putty is used for joints, etc. A. is also employed for the manuf. of cloth filters for use with corrosive liquids, and for covering rollers in textile printing works to resist the action of corrosive dyes. Mixed with fireclay, it is rolled into balls and used to radiate heat in gas fires.

Asbjörnsen, Peter Christian (1812–85), Norwegian writer and folklorist. After studying at the university of his native city, Christiania (now Oslo), served for some years as a country tutor, during which time he gave much time to the first-hand study of the poetry and folklore of the peasantry. He subsequently returned to Christiania, where he studied medicine and science. From 1846 to 1853 he was engaged by the Norwegian government in scientific work on the coast. He later spent two years in the study of forestry and became a government inspector of forests. He was afterwards appointed to the supervision and improvement of the peat manuf. amongst the peasants. He retired from the government service in 1876. In addition to sev. handbooks and memoirs on scientific and practical subjects he wrote in collaboration with his life-long friend, Jörgen Engebretsen Möe, the collection of Norwegian fairy tales which appeared under the title of *Norske Folkeeventyr*

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Asbury, Francis (1745–1816), first Methodist bishop of the U.S., *b.* at Handsworth, Eng.; sent to America in 1771 as Wesleyan missionary, in which capacity he showed untiring zeal and energy. He *d.* at Richmond, Virginia. *See* his *Journal* (1852), and Strickland's *Pioneer Bishop* (1858).

Asbury Park, a city of Monmouth co., New Jersey, U.S.A., 25 m. from New York City. It is a favourite seaside resort. Pop. 14,981.

Ascalon (modern Askulan), on the Mediterranean, 12 m. N. of Gaza, and 0 m. S.W. of Jerusalem, one of the ve chief cities of the Philistines, and he seat of the worship of the Syrian oddess Derceto. It was the bp. of erod the Great, who did much to autify it. After the disruption of e Macedonian empire it became butary in turn to Egypt and Syria. ring the Crusades it suffered many issitudes. In 1099 the Christians ned a victory outside its walls. In 7 it was captured from the califs Baldwin III., King of Jerusalem. tured by Saladin in 1187, it later into the hands of Richard Cœur ion. Its fortifications were finally royed by the Sultan Bibars in . From *Ascalon* is derived the of the *eschalot* or *shallot*, a kind nion originally grown in the unding country.

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Ascapart, a giant, 30 ft. high, to whom sev. references are made by Elizabethan writers.

Ascaris (Gk. ἀσκαρίζειν, to disturb), a genus of thread-worms, or Nematoda, which include sev. intestinal parasites, sometimes of considerable size. *A. lumbricoides*, the round-worm found in man, may attain 14 in. in length; *A. megalocephala*, found in horses and cattle, 17 in. *A. mystax* occurs in dogs and cats.

Ascarum, a genus of Aristolochiaceæ, has the species *A. europæum* growing wild in British woods; it is known as the *asarabacca*. It has two obtuse kidney-shaped leaves on each stem, and the root contains a camphor-like principle. Formerly used in the preparation of an emetic, it is now employed only in veterinary medicine.

Ascasubi, Colonel don Hilario (*b.* 1807), a Spanish-American poet, was *b.* at Buenos Ayres. He took an active part in the contests against Quiroga and Rosas, and realised his political ambitions by the separation of the confederated provs. His studies of the lives of the gauchos bore fruit in his poems, which may be called romances of the pampas. In 1864 he attended the Confederation of Paris as Argentine ambassador.

Ascendant, *see* ASTROLOGY.

Ascension, British is. of volcanic origin, situated in the S. Atlantic, lat. 7° 53′ S. and long. 14° 18′ W. 760 m. N.W. of St. Helena, 7½ m. long by 6 broad, with an area of 34 sq. m. The is. derives its name from the fact of its having been discovered on Ascension Day, 1501, by the Portuguese navigator, Juan de Nova. It was occupied by the British in 1815 in connection with the captivity of Napoleon at St. Helena, and until 1922 it was under the supervision of the Admiralty who maintained a small naval station there. In September, 1922, it was made a dependency of St. Helena and placed under the control of the Colonial Office. It is a barren, rocky peak of purely volcanic origin and destitute of vegetation, except at the highest elevation, but has been cultivated to an extent permitting the maintenance of 3000 sheep and the growth of shrubs and various vegetables. The climate is very healthy. There is a sanatorium at Green Mt. (2870 ft.), the highest point of the is. Green turtles, land-crabs, and fish are abundant. George Town, in the N.W., supplies the only good anchorage. It is connected by telegraph with St. Vincent, St. Helena and Sierra Leone and is an important

station of the Eastern Telegraph Company. Pop. estimated about 320. *See* Darwin's *Naturalist's Voyage.*

Ascension Day, or Holy Thursday, the festival of the church which commemorates Christ's A. into heaven forty days after the resurrection, and consequently celebrated on the fortieth day after Easter. The anct. ceremony of *beating the bounds* is still observed on this day, though the religious connection is obscure.

Ascension, Right. When Omar Khayyam described the sky as 'that inverted bowl,' he, as an astronomer himself, would envisage it as a bowl crossed and recrossed by the various lines by which astronomers measure the positions of stars and planets upon the inside of the bowl, *i.e.* of the celestial sphere. Also, while the ignorant Persian of Omar's time would think of the zenith, or the point in the sky immediately overhead, as being the bottom of the inverted bowl, old Khayyam, with his brother astronomers, would more naturally think of the bottom of the bowl as being at that point in the sky, not far from the Pole Star, which is the end of the axis around which the heavens appear to revolve. This point is the starting-point for all astronomical measurements, and just as on the terrestrial globe the position of a tn. or volcano is found by measuring its distance from the equator in degrees of lat., and its distance E. or W. of the meridian line passing through Greenwich in degrees of long., so on the celestial globe the position of a star is similarly obtained. The celestial equator is half-way between the two celestial poles, and the celestial meridian is a line (an arc) drawn through a point on that equator. This point, the celestial Greenwich, is known as the First Point of Aries (the Ram, the first of the zodiacal signs). The R. A. of a ... means therefore the distance in ...es on the celestial equator of an ...ecting arc (drawn from the pole ...gh the star) from the celestial ...ian—in other words, its celestial ... The earth rotates on its axis ...V. to E., making the stars ap... rise in the E. and set in the ...d the degrees of R. A. are ...ed (from 0° to 360°) in the ...n that the stars appear to be ...ng. In every hour of time 15° ...torial arc pass the meridian, ... if the First Point of Aries ...e meridian at twelve o'clock ..., the bright star Capella, ...s a R. A. of 79°, was on ...dian five hours and sixteen ... earlier. The adjective ...hich is always used with the term A. is used in the sense of 'prop... and means that the calculation... made on a *right* sphere, that is, on ... which the polar axis corresponds w... the polar axis of the heavens.

Asceticism. This word, deriv... from the Gk. ἄσκησις, which signif... the training and discipline undergo... by athletes preparing for the game... is applied to those practices an... beliefs which have as their foundatio... the idea of the eternal antagonism o... spirit and matter, and of the need o... the suppression of bodily desires for the purification of the spirit. Mainly of Oriental origin, the idea has suffered various modifications at different times, amongst different peoples and in different religions. Consisting in its lower stages of such mortifications of the flesh as fasting, flagellation, and torture, we find it to include in its higher stages the uprooting of worldly thoughts and separation from the ordinary relations of life. In the schools of Gk. philosophy varying forms of A. are to be found in the teachings of the Socratic school, with its view of the soul as imprisoned in the body, of the Stoics and Cynics, with their contempt for the material refinements and comforts of life, and of the Neoplatonists, who regarded marriage and meat-eating as obstacles in the way of the attainment of divinity. In the religion of the early Egyptians we can trace the ascetic tendency in the practices of circumcision, fasting, and abstinence from all uncleanness. Amongst the Jews ascetic practices seem to have been confined rather to special classes, such as the prophets, and to times of special distress and urgency, the more pronounced form of hermitism not appearing until shortly before the time of Christ amongst the Therapeutæ in Egypt and the Essenes in Palestine. Its most acute forms are to be met with in the self-mortification of the Hindu fakirs and dervishes, while we may look for its most spiritual manifestations in the meditations and penances of the Buddhists and Persian Sufis. With the earliest Christians A. evinced itself in celibacy, poverty, fasting, wearing of sackcloth, night vigils, and other similar practices, gaining in strength from the belief in the early reappearance of Christ. Fanatical extremes of self-mortification were reached by such men as Anthony the Hermit, Paul of Thebes, and Simeon Stylites. But with the decay of the spiritual life of the Christians the idea may be said to have crystallised itself into monasticism, the most highly-organised form of A. The tendency to extreme A. was early attacked in the Christian church by healthy minds of the ...

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Ascania, the name of a Ger. dynasty founded in the twelfth century by Albert the Bear, first Margrave of Brandenburg, whose castle, near Aschersleben, bore this name. This house was closely connected with that of Anhalt.

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Ascapart, a giant, 30 ft. high, to whom sev. references are made by Elizabethan writers.

Ascaris (Gk. ἀσκαρίζειν, to disturb), a genus of thread-worms, or Nematoda, which include sev. intestinal parasites, sometimes of considerable size. *A. lumbricoides,* the round worm found in man, may attain 14 in. in length; *A. megalocephala,* found in horses and cattle, 17 in. *A. mystax* occurs in dogs and cats.

Ascarum, a genus of Aristolochiaceæ, has the species *A. europæum* growing wild in British woods; it is known as the *asarabacca.* It has two obtuse kidney-shaped leaves on each stem, and the root contains a camphor-like principle. Formerly used in the preparation of an emetic, it is now employed only in veterinary medicine.

Ascasubi, Colonel don Hilario (*b.* 1807), a Spanish-American poet, was *b.* at Buenos Ayres. He took an active part in the contests against Quiroga and Rosas, and realised his political ambitions by the separation of the confederated provs. His studies of the lives of the gauchos bore fruit in his poems, which may be called romances of the pampas. In 1864 he attended the Confederation of Paris as Argentine ambassador.

Ascendant, *see* ASTROLOGY.

Ascension, British is. of volcanic origin, situated in the S. Atlantic, lat. 7° 53′ S. and long. 14° 18′ W. 760 m. N.W. of St. Helena, 7½ m. long by 6 broad, with an area of 34 sq. m. The is. derives its name from the fact of its having been discovered on Ascension Day, 1501, by the Portuguese navigator, Juan de Nova. It was occupied by the British in 1815 in connection with the captivity of Napoleon at St. Helena, and until 1922 it was under the supervision of the Admiralty who maintained a small naval station there. In September, 1922, it was made a dependency of St. Helena and placed under the control of the Colonial Office. It is a barren, rocky peak of purely volcanic origin and destitute of vegetation, except at the highest elevation, but has been cultivated to an extent permitting the maintenance of 3000 sheep and the growth of shrubs and various vegetables. The climate is very healthy. There is a sanatorium at Green Mt. (2870 ft.), the highest point of the is. Green turtles, land-crabs, and fish are abundant. George Town, in the N.W., supplies the only good anchorage. It is connected by telegraph with St. Vincent, St. Helena and Sierra Leone and is an important

station of the Eastern Telegraph Company. Pop. estimated about 320. *See* Darwin's *Naturalist's Voyage*.

Ascension Day, or Holy Thursday, the festival of the church which commemorates Christ's A. into heaven forty days after the resurrection, and consequently celebrated on the fortieth day after Easter. The anct. ceremony of *beating the bounds* is still observed on this day, though the religious connection is obscure.

Ascension, Right. When Omar Khayyam described the sky as 'that inverted bowl,' he, as an astronomer himself, would envisage it as a bowl crossed and recrossed by the various lines by which astronomers measure the positions of stars and planets upon the inside of the bowl, *i.e.* of the celestial sphere. Also, while the ignorant Persian of Omar's time would think of the zenith, or the point in the sky immediately overhead, as being the bottom of the inverted bowl, old Khayyam, with his brother astronomers, would more naturally think of the bottom of the bowl as being at that point in the sky, not far from the Pole Star, which is the end of the axis around which the heavens appear to revolve. This point is the starting-point for all astronomical measurements, and just as on the terrestrial globe the position of a tn. or volcano is found by measuring its distance from the equator in degrees of lat., and its distance E. or W. of the meridian line passing through Greenwich in degrees of long., so on the celestial globe the position of a star is similarly obtained. The celestial equator is half-way between the two celestial poles, and the celestial meridian is a line (an arc) drawn through a point on that equator. This point, the celestial Greenwich, is known as the First Point of Aries (the Ram, the first of the zodiacal signs). The R. A. of a star means therefore the distance in degrees on the celestial equator of an intersecting arc (drawn from the pole through the star) from the celestial meridian—in other words, its celestial long. The earth rotates on its axis from W. to E., making the stars appear to rise in the E. and set in the W., and the degrees of R. A. are measured (from 0° to 360°) in the direction that the stars appear to be travelling. In every hour of time 15° of equatorial arc pass the meridian, so that if the First Point of Aries passes the meridian at twelve o'clock midnight, the bright star Capella, which has a R. A. of 79°, was on the meridian five hours and sixteen minutes earlier. The adjective 'right' which is always used with the term A. is used in the sense of 'proper,' and means that the calculation is made on a *right* sphere, that is, one in which the polar axis corresponds with the polar axis of the heavens.

Asceticism. This word, derived from the Gk. ἄσκησις, which signifies the training and discipline undergone by athletes preparing for the games, is applied to those practices and beliefs which have as their foundation the idea of the eternal antagonism of spirit and matter, and of the need of the suppression of bodily desires for the purification of the spirit. Mainly of Oriental origin, the idea has suffered various modifications at different times, amongst different peoples and in different religions. Consisting in its lower stages of such mortifications of the flesh as fasting, flagellation, and torture, we find it to include in its higher stages the uprooting of worldly thoughts and separation from the ordinary relations of life. In the schools of Gk. philosophy varying forms of A. are to be found in the teachings of the Socratic school, with its view of the soul as imprisoned in the body, of the Stoics and Cynics, with their contempt for the material refinements and comforts of life, and of the Neoplatonists, who regarded marriage and meat-eating as obstacles in the way of the attainment of divinity. In the religion of the early Egyptians we can trace the ascetic tendency in the practices of circumcision, fasting, and abstinence from all uncleanness. Amongst the Jews ascetic practices seem to have been confined rather to special classes, such as the prophets, and to times of special distress and urgency, the more pronounced form of hermitism not appearing until shortly before the time of Christ amongst the Therapeutæ in Egypt and the Essenes in Palestine. Its most acute forms are to be met with in the self-mortification of the Hindu fakirs and dervishes, while we may look for its most spiritual manifestations in the meditations and penances of the Buddhists and Persian Sufis. With the earliest Christians A. evinced itself in celibacy, poverty, fasting, wearing of sackcloth, night vigils, and other similar practices, gaining in strength from the belief in the early reappearance of Christ. Fanatical extremes of self-mortification were reached by such men as Anthony the Hermit, Paul of Thebes, and Simeon Stylites. But with the decay of the spiritual life of the Christians the idea may be said to have crystallised itself into monasticism, the most highly-organised form of A. The tendency to extreme A. was early attacked in the Christian church by healthy minds of the type

of Jovianus and Vigilantius, and this opposition, growing in the hands of such men as Peter of Bruis, Henry of Lausanne, Wyclif, and Jerome of Prague, culminated in the Reformation of the sixteenth century. But the ascetic idea, though dethroned from supremacy in its monastic garb, has continued to play an all-important part in Christian belief and practices. At the basis of the Christian code of conduct, it has assumed in modern times definite shape in many of the doctrines of Puritanism, Quakerism, and Methodism, being familiar to us in Sabbatarianism, and opposition to theatre-going, dancing, and card-playing.

Asch, tn., in Czecho-Slovakia, 14 m. N.W. of Eger. Has manufs. of silk, cotton, woollen goods, and lace, and bleaching, dyeing, and brewing industries. Pop. 19,520.

Aschaffenburg, tn., Bavaria, in dist. of Lower Franconia, 25 m. S.E. of Frankfort. Has manufs. of paper, tobacco, clothing, and cellulose. It was the site of a Rom. fortress. The Renaissance castle of Johannisburg overlooks the town. Pop. 34,000.

Ascham, Antony (*d.* 1650), parliamentarian and agent of the Commonwealth at Hamburg in 1649, was assassinated by a party of Royalists at Madrid, whither he had been dispatched as ambassador.

Ascham, Roger (1515–68), English classical scholar and writer, was a native of the Yorkshire vil. of Kirby Wiske, near Northallerton. He was adopted by Sir Anthony Wingfield, who had him educated with his own sons. Impressed by A.'s scholarship is patron sent him in 1530 to St. ohn's College, Cambridge, where he roved himself a brilliant classical udent and gained a fellowship. He ook his B.A. degree in 1534, and his .A. in 1537. The fame of his know-lge of Gk. brought him many pils. The year 1545 saw the publi-ion of his delightful prose treatise archery, *Toxophilus*, which secured him the favour of Henry VIII. a pension of £10. In 1546 he ceeded Sir John Cheke as public or of his university, and in 1548 me tutor to the Princess Eliza-, an appointment which he re-ished two years later owing to a rol with the lady's steward. 1550 to 1553 he was in the suite Eng. ambas. at the court of es V., during which time he various places on the Con-. Including Italy. In 1553 ed his *Report on the Affaires of* *ny.* During his absence abroad appointed Lat. secretary to VI., an office which, through Gardiner's influence, he was able to continue under Mary in s of his Protestant views. Under El both he became secretary and tut retaining these offices till his dea His chief work, *The Scholemaster* (by Prof. Mayor, 1863), a treatise education, was pub. by his widow 1570. His letters are to be found Dr. Giles's ed. of his works (3 vols 1864–5). *See also* Katterfeld's *Rog* *Ascham*, 1879.

Aschersleben, tn., Prussian Saxony, 30 m. N.W. of Halle. Has woollen, sugar, metal, and chemical manufs., and brine baths. Pop. 28,000.

Asciano, tn. of Tuscany, in prov. Siena. Contains sev. fine fourteenth-century churches. Remains of Rom. baths were found in 1898. Pop. 8300.

Ascidiacea (Gk. ἀσκίδιον, little bottle), the sea-squirts, an order of tunicates which may be fixed and individual, free-swimming and colonial; the adults have neither a tail nor a notochord. *Molgula* and *Ascidia* are genera.

Ascites (Gk. ἀσκός, skin-bag), or abdominal dropsy, is caused by an abnormal collection of serous fluid in the peritoneal cavity. The fluid, which coagulates on standing, is usually clear and of a pale yellow colour.

Asclepiadaceæ, an order of dicotyledonous plants resembling very closely the Apocynaceæ. The reproductive organs are extremely curious; the two carpels are free at the base, but unite in one style, and to the edge of the stigma the anthers of the five stamens are joined. The plants are insect-pollinated. The flower is regular and hermaphrodite, the calyx has five free sepals, and the corolla five joined petals. Many species grow in N. America, and *Asclepias tuberosa* is largely cultivated in Europe.

Asclepiades: (1) A Gk. lyric poet of Samos, who flourished in the second century B.C. Supposed to have been the master of Theocritus and inventor of the metre called after him *Metrum Asclepiadeum*. The Gk. anthology contains thirty-nine epigrams ascribed to him. (2) A famous physician of Prusa, in Bithynia, who settled in Rome and founded the Methodical school of medicine. His treatment, consisting of open-air exercise, bathing, and change of diet, was based on the theory that disease is caused by the irregular distribution of the corpuscles of the body.

Asclepiadic, a form of metre in poetry which derives its name from the Gk. poet Asclepiades. It consists of twelve syllables accented as follows: spondee, two choriambi, and an iambus (– – | – ⏑ ⏑ – | – ⏑ ⏑ – | ⏑ –). This is known as the *little* asclepiad,

in contradistinction to the *greater*, which has three choriambi in the middle of the line. The asclepiad is not a common form, the Rom. poet Horace only employing it in three of his odes.

Example of the little asclepiad :

" Dōnā + | rēm pătĕrās ‖ grātăquĕ cōm | mŏdūs
Cēnsōr + | īnĕ mĕīs ‖ ǣră sŏdāl | ĭbūs."
(iv. 8.)

Example of the greater asclepiad :

' O crūd + | ēlīs ădhūc ‖ ĕt Vĕnĕrīs ‖ mūnĕrĭbūs | pŏtēns
Īnspēr + | ātă tŭǣ ‖ quūm vĕnĭĕt ‖ plūmă sŭpērb | ĭǣ." (iv. 10.)

Asclepias, a genus of tropical plants, the type of the order Asclepiadaceæ. Many possess medicinal properties, and the name is derived from Æsculapius, the god of medicine. *A. Syriaca* is the Syrian swallow-wort; *A. cornuti* is cultivated in Britain.

Ascoli, David d', Jewish author of the sixteenth century. He issued a manifesto against Pope Paul IV. for unfair measures against the Jews, and was the author of *Apologia Hebræorum* (Strassburg, 1559).

Ascoli, Francesco Stabili, known as **Cecco d'** (1257–1327), Italian poet and astrologer, incurred the enmity of the Inquisition, was driven from the professorship of astrology at Bologna, and finally burnt at the stake.

Ascoli, Graziadio Isaia (1829–1907), Italian philologist, was *b.* at Görz, the son of Jewish parents. As a result of his *Studii Orientali e Linguistici*, he was in 1861 appointed professor of philology at the Milan Academy, which position he held till 1902. His chief work was *Fonologia Comparata del Sanscrito, del Greco, e del Latino*, 1870. He also pub. *Lettere Glottologiche*, 1886, and articles in the *Archivio Glottologico* of Milan.

Ascoli, Trojano Marcelli, Duke of (*d.* 1823), Neapolitan statesman and confidential agent of King Ferdinand IV. of Naples before and after the installation of Joseph Bonaparte on the throne.

Ascoli Piceno, city and prov., Central Italy (the Marches). The prov. has an area of 796 sq. m., and a pop. of 250,000. The city, on the R. Tronto, is built on the site of the anct. Asculum Picenum, and contains various architectural remains of Rom. times. Constantine the Great is said to have built the cathedral. It has manufs. of glass, pottery, majolica, paper, etc. Pop. 32108.

Ascoli di Satriano, episcopal city, prov. of Foggia, Southern Italy, 19 m. S. of Foggia. Supposed to be the site of the anct. Asculum Apulum or Satrianum, the scene of the defeat of the Roms. by Pyrrhus (279 B.C.). Pop. 9219.

Asconius Pedianus, Quintus (2 B.C. to A.D. 83), was the author of valuable commentaries on Cicero, which have helped to clear up many obscurities. The manuscript was discoverd by Poggio Bracciolini in 1416, and has been well ed. by Orelli and Barter in their ed. of Cicero. *See also* Madvig's *De Asconii Pediani Commentariis Disputatio* (Copenhagen, 1828).

Ascot Heath, Berkshire, 6 m. S.W. of Windsor, is famous for its circular race-course, nearly 2 m. long, the scene of the annual Ascot meeting in June. King Edward VII. took great interest in the alteration and improvement of the course in 1902.

Ascot Vale, suburb of Melbourne, Australia, on Saltwater River.

Asculum, anct. name of Ascoli, Italy (*q.v.*).

Aseerghur is a strongly fortified tn. of India, in the prov. of Camdeist and the gov. of Bombay, 20 m. N.E. of Boorhanpore. The fortress is situated on a hill, and was long called by the natives the Key of the Deccan, owing to its strong position. The tn. was first taken by the Eng. in 1803, and after being restored to Scindia on the conclusion of peace, was recaptured in 1819.

Asellio, Gasparo (1581–1626), Italian surgeon, is best known by his discovery of the lacteal vessels, on which subject he wrote his *De Lactibus* (Milan, 1627). He was for some time professor of anatomy and surgery at Padua.

Asellus (Lat., little ass), a small isopod crustacean commonly found in ponds and stagnant water in Britain. It belongs to the family Asellidæ, and is allied to the wood-lice.

Asepsis, the absence of injurious micro-organisms. A condition is said to be *aseptic* when no pathogenic germs are present; *antiseptic* when there is present some substance designed to destroy or prevent the development of such germs.

Ases (plural of Icelandic *Ass*, god), or **Æsir**, is a name given to a race of gods in Scandinavian mythology. Odin was their chief, and Thor, Balder, Bragi, Heimdal, and Loki were the next in importance; the chief goddesses were Freyja, Frigga, Saga, Snotra, and Idun. There home was Asgard, the equivalent of Olympus.

Asexual, a biological term applied to plants and animals which can reproduce their kind and are yet devoid of sex. In the case of some algæ (plants which include sea-weeds), *e.g. Ulothrix*, a cell will produce sev. ciliated spores which either form new plants by themselves, or by fusion with identically similar (and conse-

quently sexless) spores. The case of some animals, *e.g. Amœba*, the solitary cell divides in two, thus forming two individuals; this process is known as *self-division*, and occurs also in low plant life. Budding or gemmation is the outgrowth of buds on a parent plant or animal which form new life of a similar character.

Asgard, lit. the tn. of the Æsir, was, according to Scandinavian mythology, the home and habitual residence of the gods, or Æsir. Like the Gk. Olympus it rose from the earth, called midgard or middle world. Here Odin and the twelve Æsir dwelt, assembling in council every day under the Yggdrasil, or ash tree. The mansion of the gods was called Gladsheim, that of the goddesses Virgulf; here also was Walhalla, the home of heroes slain in battle.

Asgill, Sir Charles, son of the first baronet, was taken prisoner in the American War of Independence, and chosen by lot to be executed in the place of Captain Lippincot, whom the Eng. refused to yield to Washington for hanging an American officer. A. was ultimately released, and became a general.

Asgill, John (1659–1738), pamphleteer and lawyer, acquired great notoriety as the author of the pamphlet *An Argument*, etc., which denied the necessity of death, and maintained that heaven was attainable without passing through death. For this he was expelled in turn from the Irish (1703) and Eng. parliaments (1707). He was ultimately imprisoned for debt, but continued to issue pamphlets from the Fleet prison.

Ash, the name applied to sev. plants of the order Oleaceæ and genus *Fraxinus*, which are related to the



ASH

privet, and lilac. *F. excelsior* common A.; *F. ornus* is the A. or flowering A. of S. Europe. The fruit of the A. winged for wind-distribution, and wood provides an excellent timber. The prickly A. of America belongs the same order, and is called *Zanthoxylum fraxineum*.

Ash of Jerusalem, old term for woad or dyers' weed.

Ash, Edward (*d.* 1829), an English physician, is known because of his discovery that every time metals which are unequally oxidisable are brought in contact, electricity is generated; this is the base of the galvanic battery.

Ash, Mountain or **Rowan-tree**, is the *Pyrus aucuparia* of the order Rosaceæ, and is related to the pear and apple. The fruit is leathery.

Ash-Wednesday, the first day of Lent, derives its name from the Catholic ceremony of sprinkling on the heads of penitents ashes from the burning of the undistributed branches of consecrated palm. The custom is said to have been instituted by Gregory the Great, and was finally sanctioned by Pope Celestin III. in 1191.

Ashango, the name of an African tribe of the Fr. Congo. There are sev. sub-tribes, including the pigmy Obongos. The As. are fetish-worshippers and slave-holders, and are remarkable for the fact of being fully-clothed.

Ashanti, a county of the Gold Coast Colony, W. Africa, consists largely of forest country. It is divided into two provinces, the Eastern, with headquarters at Kumasi, and the Western, with headquarters at Sunyari; each of these being subdivided into districts under commissioners who exercise limited jurisdiction. The country is hilly, and, on the whole, unhealthy. The land is fertile and well-cultivated near the towns, producing, amongst other things, rice, maize, millet, cocoa, sugar, fruits, gums, and timber. Gold, rubber, kola, and cocoa are exported in considerable quantities. Kumasi (Coomassie) is the chief tn. Until 1896, when it became a British protectorate, A. was a separate native kingdom. The As. have long been noted for their warlike and predatory tendencies. Their incursions on the Fantis led to the first British expeditions, 1807–11. In 1874 Sir Garnet Wolseley captured and burned Kumasi. Another expedition in 1895–6 ended in the removal of the king, Prempeh, and the establishment of the protectorate. Further troubles were suppressed by the expedition of 1900, and the country was definitely annexed by Great Britain in 1901. Before the British settlement, human sacrifices were a regular part of the

fetish religion. The As., according to tradition, derive their origin from the fugitives driven southwards about three hundred years ago by Moslem tribes from Senegal and the Niger. Kumasi, the capital, with 25,000 inhabitants, has buildings which would compare with many in the more popular thoroughfares of London. Yet but a couple of hours' journey northward, elephants, buffalo, and bongo still roam the country and, startled by the whir of motor cars on the fine motor-roads (of which there are now some 1160 m.) turn back into their ever-narrowing lairs. Some 4,000 children are taught either in the government or missionary schools of A. In Kumasi may be seen African gentlemen possessed of various academic qualifications, and dressed in European garb. The native women also are dressed in London and Paris frocks, with silken stockings and high-heeled shoes. This new generation rubs shoulders with the older, composed of grey-haired aristocrats in woven togas, and chiefs borne along in hammocks covered with leopard skins, men who formerly took part in the human sacrifices which made A. once a byword. The whole secret of the change would seem to be the prosperity which has come with the cocoa trade, the wealth from which has built schools and roads and railways. Agriculture is expanding and coffee plantations are also being formed. There are rich forests of mahogany and cedar. The annual gold output is valued at £450,000. Railway tracks traverse the once forbidding Prah. Kumasi is the railhead of two lines which link up the coast now only 12 m. distant. A great motor-road passes north over swamps, escarpments, and rivers, to emerge from the forest belt into a land of open orchard country. Pop. 407,000 (400 Europeans). The peaceful relations which, under the Gold Coast Government, have been maintained for many years now between A. and the neighbouring tribes have been marked by frequent petitions from the Gold Coast Colony as well as from A. for the return from exile of Prempeh, the former chief of Kumasi. The Gold Coast Government's confidence in the loyalty of the Ashantis led to the granting of this request in 1924 and to approval being given in 1926 of his election by the Ashantis as Head Chief of the Kumasi tribe. See Reindorf's *History of Gold Coast and Ashantee*, 1895, and Armitage and Montaro's *Ashanti Campaign of 1900*.

Ashbee, Henry Spencer (1834–1900), author and bibliographer, b. in London; became senior partner in the firm of Charles Lavy & Co., merchants, of London and Hamburg, and on retiring from business devoted himself to travel, bibliography, and book collecting. He compiled a magnificent library of Cervantic literature, extra illustrated books, and first eds. of English authors, which he left to the British Museum. He also bequeathed to the Victoria and Albert Museum a collection of water-colours, and to the National Gallery two fine paintings by R. Wilson and W. P. Frith. Author of *Notes on Curious and Uncommon Books*, 3 vols. (1877–85); and *An Iconography of Don Quixote, 1605–1895* (1895), and sev. other bibliographical works.

Ashbourne, or Ashborne, mrkt. tn. Derbyshire, on the Dove, 13 m. N.W. of Derby. The fine cruciform church, dating from the thirteenth century, has a beautiful spire, over 200 ft. high which is known as the 'Pride of the Peak,' and a fine monument by Banks. The town has a grammar school, founded in 1585. Two engagements took place here during the civil war. Pop. 4144.

Ashbourne, The Right Hon. Edward Gibson, first Baron (1837–1913), was born at Dublin. He was M.P. for Dublin University 1875–85; attorney-general for Ireland 1877–80; lord chancellor of Ireland, 1885–92, and 1895–1906. He was created a baron in 1885, the year of the passing, under his guidance, through parliament of the Land Purchase Act known as 'the Ashbourne Act.'

Ashburnham, John (1603–71), friend and agent to Charles I., assisted that monarch in various negotiations of the civil war, including the treaty of Uxbridge and the visit to the Scots army. He contrived the king's flight from Hampton Court. He was banished after Charles's death, but returned at the Restoration.

Ashburton, a tn., S. Devonshire, on the Yeo, 10 m. N.W. of Totnes. It became a stannary tn. in 1328 by a charter of Edward III. It has a fine cruciform church, St. Andrew. Until the Reform Act of 1832 it returned two members to parliament; from then till 1868 one. Pop. 2362.

Ashburton, a tn., co. of A., S. Is., New Zealand, on the A. riv., 50 m. S.W. of Christchurch. Pop. 6652.

Ashburton River, N.W. of W. Australia, 400 m. long, flows into the Indian Ocean near Exmouth Gulf.

Ashburton, Alexander Baring, Lord (1774–1848), son of Sir Francis Baring, founder of the famous banking-house of Baring Brothers, succeeded his father in 1810 as head of the business. From 1806 to 1832 he was the Liberal member for Taunton, Callington, and Thetford. In 1833 he became the

moderate Conservative member for N. Essex. He was president of the Board of Trade in Peel's gov., 1834–35, and was created a baron in 1835. As special commissioner to the U.S. he concluded the A. treaty of 1842, which settled the N.W. frontier between Canada and the U.S.

Ashburton, John Dunning, Lord (1731–83), a distinguished lawyer, became successively recorder of Bristol, 1766; solicitor-general in the Duke of Grafton's administration, 1767; M.P. for Calne, 1768; chancellor of the Duchy of Lancaster, and privy councillor. He was created a baron in 1782. *See* Roscoe's *Lives of Eminent British Lawyers.*

Ashburton, William Baring, 2nd Lord (1799–1864), is best remembered for the *salon* of his first wife, who entertained many distinguished politicians and writers.

Ashbury, par. and vil., Faringdon dist., Berkshire, England, 6½ m. E. of Swindon. Near it is Wayland Smith's Forge. Pop. 534.

Ashby, Turner (1824–62), American cavalry leader in the Confederate Army; *b.* in Virginia. At the outbreak of the Civil War he raised a cavalry regiment and met with great success under Johnson and Jackson. He was killed at Harrisonburg, Va.

Ashby-de-la-Zouch, markt. tn., Leicestershire, 16 m. N.W. of Leicester. Has manufs. of leather goods and hats. The name derives its uffix from the Norman family of La ouch, who built a castle here. The astle was rebuilt in the fifteenth cenury by Sir William Hastings, and rved for some time as a prison of ary Queen of Scots. It was deolished by the parliamentarians ring the civil war. The fine old urch of St. Helen contains a 'finger ory', and the tombs of the Hasts or Huntingdon family. The nhoe saline baths, built in 1826, e been much frequented for their s in rheumatic and scrofulous plaints. Pop. 4983.

hdod (modern Isdud, or Esdûd), stine, 22 m. S.W. of Joppa, now d vil., was formerly one of the Philistine cities. The Philistines ht here the Ark of the Covenant aced it in the temple of Dagon. res in the N.T. under the name tus. It was captured by the ns in the eighth century, and Egyptians in the seventh cen- After being sacked by the ees it was rebuilt by the Ro-

wn Park, seat of the Earl of W. Berkshire, 3½ m. N.W. of ne. In the vicinity is the site of Ethelred and Alfred's tory over the Danes in 871, and the cromlech known as Wayla Smith's Cave.

Ashe, Simeon (*d.* 1662), Nonconformist divine, educated at Emmanuel College, Cambridge. Whe the civil war broke out he becam chaplain to the Earl of Manchester and after the war became rector of St Austin and a Cornhill lecturer. He was a moderate Cromwellian, and was among the divines who went to meet Charles II. at Breda. Joint author with William Goode of *A Particular Relation of the most Remarkable Occurrences from the United Forces in the North*, and author of *A True Relation of the most Chiefe Occurrences at and since the late Battell at Newbury,* 1644, both vindications of the Earl of Manchester; and several sermons.

Ashehoh, or Alchuku, city of Kirin, Manchuria, 30 m. S. of R. Sungari. It has a large trade, and a pop. of 30,000 to 40,000.

Asher (Heb., blessed), one of the tribes of Israel, whose lands reached from Lebanon to Dor; descended from A., the eighth son of Jacob, borne to him by Zilpah, the handmaid of Leah. A genealogy of A. may be constructed from Gen. xlvi. 17; Numbers xxvi. 44; 1 Chron. vii. 30. It is also mentioned in Gen. xxx. 13; Judges vi. 35, and vii. 23; and Josh. xix. 24–31, where the ter. of the tribe is given. As few of the places named have been identified, the locality is doubtful, but was probably in S. Palestine.

Ashera, a goddess of the Phœnicians, or the idol which she symbolised. Mentioned in the O.T., and it is probable that she was associated with tree-worship. It is trans. 'grove' in the A.V. The rites were associated with the worship of Astoreth, from which the former name is supposed to be derived.

Ashes, the residue from the burning of animal and vegetable matter, and to a certain extent of mineral bodies also. Vegetable A. are composed of oxygen, hydrogen, and carbon. Animal A. consist principally of phosphate of lime, with traces of salts of lime, magnesia, and soda. Mineral A., such as those of Vesuvius, are found to contain alumina, oxide of iron, charcoal, and potash among other ingredients.

Asheville, co. seat of Buncombe co., N. Carolina, U.S.A., at junction of Swannanoa and Fr. Broad Rs., 210 m. W. of Raleigh. Situated in a picturesque dist., and having a mild and equable climate, it is a favourite health resort. It has manufs. of cotton, tobacco, leather, and machinery. Pop. 50,167.

Ashfield, a tn. in New South Wales, Australia, about 5 m. from Sydney to the S. Pop. 40,460.

Ashfield, Edmund (*fl.* c. 1680), an Eng. painter, pupil of Michael Wright. He was, according to Horace Walpole, equally clever with oils and pastels.

Ashfield, Albert Henry (Stanley), 1st Baron, (*b.* 1875). Politician and railway manager. S. of Henry Stanley of Detroit. Educ. in the U.S.A., where he became general manager of electric railways. President of the Board of Trade in England 1916–19; but resigned owing to ill health. Created a peer in 1920. Now managing director of the Underground Electric Railway Company and the London General Omnibus Co.

Ashford, a markt. tn. in Kent, on the R. Stour, 14 m. from Canterbury. It has a fine old church, and the tn. does a large trade in brewing, brick-making and tanning among other industries. At the new end of the town there are large railway workshops. Pop. 14,351. Municipal borough, 43,333.

Ashik (1518–71), a Persian poet. He occupied sev. important posts in the gov. of his time, and occupied his leisure by writing poetry. His principal work is a *Book of Poets.*

Ashikaga, a tn. in Japan, about 70 m. from Tokio. It was once the seat of an anct. academy of Chinese lore, and a statue of Confucius is still existent here. A big trade is done in cotton and silk. Pop. 38,908.

Ashira, a Bantu tribe inhabiting the coastal dist. W. of the Fr. Congo, and between the Congo R. and the Equator. They are coal black and of good physique, and are skilful workers in iron and copper, and in cloth-weaving.

Ashkenaz, a northern race mentioned in Gen. x., who lived in Armenia. They were supposed to be descended from Gomer.

Ashland: (1) A city, Ashland co., Wisconsin, U.S.A., situated on an arm of Lake Superior. It has large iron and timber industries. Pop. 10,622. (2) A city of Boyd co., Kentucky, U.S.A., with a large trade in iron and woollen goods. Pop. 29,050. (3) A town in Oregon, U.S.A., a popular health resort. Factories. Pop. 4283. (4) A borough of Schuylkill co., Pennsylania, U.S.A., 12 m. N.W. of Pottsville. Has coal mines and machine shops. Pop. 7164. (5) A vil. of Hanover co., Va., U.S.A., 17 m. N.W. of Richmond: the seat of the Randolph-Macon College. Pop. 1297.

Ashlar, a squared building stone used in masonry. It is laid in regular courses and used direct from the quarry unprepared.

Ashley, Anthony, *see* SHAFTESBURY, EARL OF.

Ashley, Lord (1621–83), Eng. politician, was the early title of Anthony Ashley Cooper, Earl of Shaftesbury (*q.v.*).

Ashley, Right Hon. Anthony Evelyn Melbourne (1836–1907), son of the late Lord Shaftesbury. Secretary to Lord Palmerston, 1859–65; M.P. for Poole, 1874–80, and Isle of Wight, 1880–5; secretary for Board of Trade, and afterwards under-secretary for the colonies. Wrote a life of Lord Palmerston.

Ashley, Sir William James (1860–1927), professor of history at Toronto, and later at Harvard and Birmingham universities. Wrote much on history and political economy. His works include: *Introduction to English Economic History and Theory,* 1888–93; *The Tariff Problem,* 1903; *Progress of the German Working Classes,* 1904. Knighted 1917. Rendered service on Committees on Prices during the Great War.

Ashmole, Elias (1617–92), an eminent antiquary, the founder of the Ashmolean Museum at Oxford. He was *b.* at Lichfield. He studied law, and in 1638 became a solicitor in Chancery. In 1631 he was sworn an attorney of the Common Pleas. In 1645 he became one of the gentlemen of the ordnance in the garrison at Oxford, and afterwards entered Brasenose College, applying himself to natural philosophy, mathematics, and astronomy. In 1660 Charles II. made him herald at Windsor, He was afterwards called to the bar in the same year and made an F.R.S. A fire in 1679 lost him the greater part of his library. In 1682 he sent to Oxford University his collection of curiosities which he had received from John Tradescant of Lambeth, the celebrated gardener, and from the latter's father. His writings include *Fasciculus Chemicus or Chemical Collections, Theatrum Chemicum Britannicum,* and *The Way to Bliss,* a treatise on the philosopher's stone.

Ashmolean Museum, at Oxford, founded in 1679 by Elias Ashmole, and up to 1894 kept in a house in Broad Street. The natural history exhibits were taken to the University Museum, and the rest of the collection to the new Univ. Galleries in Beaumont Street. The Selden and Arundel Marbles are among the most valuable exhibits possessed by this museum, and there is an interesting collection of Sumerian antiquities gathered at Kish, Iraq.

Ashmunein, a small vil. of Upper Egypt. It is situated a few miles from the l. b. of the R. Nile. It possesses the anct. ruins of Hermopolis Magna.

Ashokan Reservoir, now under construction, 13 m. W. of Kingston,

New York, for collecting the main part of the New York water supply from the Schoharie. Esopus, and Catskill watersheds. Approximately 12 m. by 1 m. with a maximum depth of nearly 200 ft.

Ashover, a par. of Derbyshire, near Chesterfield, which manufs. lace and hosiery. Pop. 2432.

Ashraf, a small scattered tribe of African Arabs. They inhabit a region near Tokar, and the Amarar country to the N. of Suakin. They claim [illegible] their [illegible] Sheri[illegible] descendants.

Ashtabula, a city of A. co., Ohio, U.S.A. It is connected by the Pennsylvania, the Lake Shore and Michigan Southern and New York, Chicago, and Michigan railways. It has an excellent harbour. Among its manufs. are leather, worsteds, and agric. implements. The name A. is an Indian word meaning 'fish-river.' A great proportion of the pop. are of Finnish [illegible] Finnish paper, th[illegible] (estab. 1897), is [illegible], and is one of the most widely read Finnish newspapers. Pop. 23,301.

Ashtaroth, *see* ASTORETH.

Ashton-in-Makerfield, an urban dist. in Lancashire. There are large collieries, and iron goods are extensively manufactured. Pop. 22,475.

Ashton-under-Lyne, a manufacturing tn. in the Salford dist. of Lancashire, on the N. b. of the R. Tame. Dukinfield, a transpontine suburb, is in Cheshire. A. is 6½ m. from Manchester; the chief industry is cotton, and there are many collieries in the district; hats, woollens, and silks are also manufactured in the [illegible],179.

[illegible] (1842–1930) [illegible] Baron Ashton), English manufacturer and benefactor, son of James Williamson of Lancaster. Succeeded to a lucrative business his father had estab. in the manufacture of table-baize, American leather cloth, and linoleum. He derived a great fortune from these factories, which were situated in Lancaster and elsewhere. His subscriptions to war loans were enormous, and he took stock to the value of £3,000,000 in the Thousand Million War Loan alone. Was a generous benefactor of his native town, Lancaster, and also gave largely to St. Anne's-on-Sea. Was High Sheriff of Lancaster in 1885, and, in 1886, [illegible] caster Div. in the [illegible] a seat which he [illegible]n he was created Baron A. of A. Later, he gave to Lancaster a new town hall and municipal buildings, besides maintaining the park which had been made from a bleak upland by his father. In business life, he showed great concern for the welfare of his work-people; and when the National Insurance Act was passed, he arranged to pay all contributions under the Health Section. In 1918, he contributed £10,000 to the King's Fund for disabled officers and men. His tastes were simple, his personal wants few, and he was among the most unostentatious and retiring of men.

Ashton, Charles (1665–1752), an eminent scholar and divine. He was a native of Derbyshire, and was educated at Queens' College, Cambridge. His pub. works include valuable additions and corrections of corrupt translations of inscriptions.

Ashton, Hugh (*d.* 1522), an archdeacon of York. He was interested particularly in St. John's College, Cambridge, in which he worked with his patroness, Lady Margaret, Countess of Derby, of whose household he had earlier been appointed comptroller.

Ashton, John (*d.* 1691), a Jacobite. He was for a time a servant of James II., and supported his master during his exile. He was found with treasonable documents, and was executed at Tyburn. He acted on the day of his death with considerable fortitude, handing to the sheriff a paper which was afterwards pub. on the continent to the consternation of the authorities.

Ashurada, a Russian naval station, on is. of same name in Bay of Astrabad, Caspian Sea. It was acquired by Russia in the reign of Nicholas I., and was f[illegible] It is now [illegible]

Ashwel[illegible] bridge, Bishop Wilberforce appointed him prin. of the Oxford Diocesan Training College at Culham. He possessed a reputation as a writer and preacher. He pub. *Schoolmaster's Studies; Lectures on the Holy Catholic Church* [illegible]

[illegible] tic[illegible] He was a famous supporter of the Anti-Corn Law League. He *d.* from the effects of catching a chill during a journey from Rome.

Asia, the largest continent, occupies the N. portion of the E. hemisphere, extending beyond the Arctic circle and nearly reaching the equator. It contains about one-third of the whole of the dry land, and one-twelfth part of the whole surface of

the globe. The philological origin of the name is unknown, though it seems probable that it was at first used with a restricted local application, gradually extended to the whole continent. Geographically speaking, Europe is a mere appendix to A., and exact delimitation in that sense is impossible, though the line of separation from Africa is better defined by the Red Sea. The N. boundary of A. is the Arctic Ocean, the extreme N. point being Cape Sievero-Vostochny. The S. boundary, it is impossible to fix with exactitude, but the volcanic chain of Is., which can be traced through the Molucca and Sunda Is., may be taken as the limit. The S. coast-line is much more irregular, and broken by the three great peninsulas of Arabia, Hindustan, and Cambodia. The Mediterranean and Black Seas form natural W. limits to the continent, as does the Red Sea lying between A. and Africa. The Ural R. and Mts. are the common conventional boundaries with Europe N. of the Caspian, whilst the Manych depression is used as the limit of A. between the Black and the Caspian Seas, and the Bering Strait, 36 m. wide, separates A. from America. The peninsula area of the continent is one-sixth of the whole, a proportion surpassed only by Europe. Excluding this area, the continent resembles an enormous quadrilateral, of which the centre is 1600 m. from the sea. Whilst over a quarter of the area lies below 650 ft., 1·3 per cent. being below sea-level, one-seventh is over 600 ft. Four great divs. may be escribed in A.: (1) The N. Lowlands.) The Central Mt. System. (3) The . Margin, including the Is. (4) The W. Table-lands.

1. *The N. Lowlands.*—The lowds of A. lie to the N. of a line from Sea of Okhotsk to the Caspian. y may be classified in three divs. Turanian lowlands, forming the div.; between them and W. ria, which forms the second div., e Kirghiz steppe; the third div., of E. Siberia, is of a more rugged re. Turan (Russian Turkestan) ow, sand-covered plain forming Aralo-Caspian depression. The rt plateau, E. of the Caspian, e Kirghiz steppe to the N., are ghest parts. Here the rivs. all ate or flow into lakes with no Thus the Ural flows into the , the Amu and Syr into the nd the Ili into the Balkhash. eria is a flat, low-lying, and region, between the main f the Yenisei and the Ural e Tobol and the Lower Ob S., and the Irtish and the Ob S.E., flow into the low-lying W. region. E. Siberia is a more and uneven land; the Indigirk the Kolyma drain the N. part Upper, Middle, and Lower Tung Rs. the W. part, flowing to Yenisei. The Lena flows through central regions. Various continu mt. ranges, the Verkhoyansk, Stanovoi, etc., running from the Le delta to Cape Dezhneff, form the boundary.

2. *Central Mt. System.*—The central mass of mts. and plateaus wide gradually from the W. to the E. A two points in this mass the N. and S lowlands approach each other mor closely, in Armenia and in the Pamirs. Between these two points are three series of mt. chains, the N., the central, and the S. Between the N. and central chains there is a series of depressions, between the central and S. a series of plateaus. W. of Armenia the Caucasus and Yaila Mts. border the depression of the Black Sea, from which A. Minor on the S. is separated by the Pontic chain. There is in this region much evidence of recent volcanic disturbances. On the E. of Armenia the Elburz, Khorassan, and Hindu-Kush Mts. form the dividing line between the Turan depression and the Iran plateau. The N. ranges are not so clearly defined here, but may be traced in the W. spurs of the Tian-Shan Mts. The Iranian plateau, on the whole a deserted region, is bounded by narrow folded ridges and furrows, dominated by a massive chain of Cretaceous peaks. The Pamir plateau, bordered on the E. by the Sarikol and Muztaghata ranges, and on the N. by the Tian-Shan range, is much loftier. The ranges of the Tian-Shan run both W. and E. from the plateau, but the E. extension is far the more important, forming the boundary of Chinese Turkestan. The Kuen-Lun range, running due E. from the Pamirs, has on the N. Chinese Turkestan, and on the S. the Tibetan plateau. It extends for almost 2300 m., having the highest average level of any mt. chain in the world. The Tibetan plateau consists of a number of bare parallel ranges and troughs running from W. to E., with an average height of over 13,000 ft. Lofty mts., which are crossed by passes at an alt. of over 15,000 ft., form its boundaries. The Kaka-Koram range, which has the greatest glaciers in the world, Biafo, Baltoro, and Hispar, runs S.E. from the Pamirs and forms the W. end of the platform. The S. end is formed by the Himalayas, with even loftier peaks, among them Mt. Everest, 29,000 ft., and pierced by the gorges of the Indus, the Sutlej, the Ganges, and the Brahmaputra, among other rivs. These continua-

tions of the folded mt. system form the main lines of S.E. A. The W. chain passes by the Khasi and Arakan ranges, and the Andaman and Nicobar volcanic is, to the Malayan chain, also volcanic in character. It is separated from the central chain forming the Malay peninsula, by the Irawadi basin and the Andaman Sea. All these mts., from A. Minor to Malaysia, were folded in the Tertiary period, and are part of the younger mid-world mt. system. Their main feature-lines are due to movements of the earth's crust, where only the superficial features have so far been affected by active denudation. The other mts. of Central A. are of a much older date; the valleys have been hollowed out of plateaus, characterised by anct. foldings of the rock layers. The land, however, is partly shaped by fractures, the deep rifts in which the waters of Lake Baikal have accumulated to a depth of over 4500 ft. being the most remarkable example. Similar rifts may be observed in E. Africa. Round Lake Baikal four great masses of the highlands can be specified. These are the Sayan and the Altai Mts. in the S.W., the W. Trans-Baikalian to the S.E. and E. and the plateau of Mongolia to the S. These highlands are much less lofty than the mt. systems of more recent origin. The loftiest of them, the Altai, N. of the Dzungaria plain, which connects the Siberian lowlands with the Mongolian plateau, have great glaciers in the upper valleys, and are heavily wooded on the wetter northern slopes. They contain many minerals, including gold. The Malk-an Mts, form the culminating line of e Trans-Baikal plateaus, but do not, was formerly supposed, form the ain divide between the Arctic and acific river basins. The Mongolian ateau, the average height of which 3500 ft., is a stony sand-covered ppe, hence its native name of amo (sea of sand), or Gobi. The rgan Mts, form the E. limit of region.

The E. Margin of Asia.—Along eat circle from Cape Dezhneff, nd the tropic of Cancer, a series arps can be traced, composed of rms, one of which is parallel to eridian, the other to the lines . This line is climatically and mically significant. In the ine also, and in the peninsulas ands of the extreme E., a some-milar succession of feature lines observed, running alternately S., and E. and W. Between ature lines lie great depres-In the W. there are Man-nd the S. China and Tong-ins. In the E. they form the seas of Bering, Okhotsk, Japan, a E. China. The seas between Philippines and the Marianne Is., a the Sulu, Celebes, and Molucca Se lie to the extreme S. Three gre rivs, the Amur, the Hwang-ho, an the Yang-tse-Kiang, rise in the pla teaus of A. and break across these E escarpments to the sea. The fringin is. are mainly volcanic; the volcanic line forms a great arc through the Moluccas, joining the line already traced by the Andaman and Nicobar Is., Sumatra, Java, and the Lesser Sunda Islands.

4. *S.W. Asiatic Table-lands.*—Geologically the Deccan and Arabia are a continuation of Africa, the former resembling S. Africa, the latter N. Africa. The Mesopotamian and Indo-Gangetic plains are formed of alluvium brought down by the rivs. Euphrates and Tigris to the former region, by the Indus, the Ganges, and the Brahmaputra to the latter. All these rivs. form great deltas.

Climate.—A. may be divided into ten climatic regions: (1) The prov. of W. Siberia is very cold in winter and hot in summer. (2) E. Siberia is even colder in winter, and drier; it includes the pole of cold about Verkhoyansk, the coldest spot in the E. hemisphere. (3) The Kamchatka prov. has a moister and more genial climate. (4) China and Japan have a cold winter and monsoon rains in the summer. (5) The Central Asian plateau is exceedingly dry, with very cold winters, its height, above sea-level enhancing the cold. (6) The Aral-Caspian plateau is a very dry region with a depressingly hot summer. (7) The Arabian region and Iraq have the same characteristics as the foregoing. (8) The Mediterranean region, including A. Minor, has the best climate, having no extremes of temp. (9) The lower Indus valley is dry and very hot. (10) India, the Indo-Chinese Peninsula, and Australasia have a tropical climate, with abundant periodical rains, and a limited range of temperature.

During the winter A. as a whole has a lower temp. than corresponding lats. elsewhere; but a higher corresponding temp. in July. The extreme cold of N.E. A. in the winter causes a high pressure of air, which flows S.S.E. and S.W. in January. Thus N.W., N., and N.E. winds prevail at that period in Manchuria, China, India, and S.E. Europe. In July S.W. and W. winds prevail on the W. coasts of India, S. and S.E. winds in S.E. A., and E.N.E., N.E., and E. winds in N.E. A. The rainfall of A. is very unequally distributed. The W. coast of India, the Indo-Chinese peninsula, and the

valley of the Ganges receive more than 75 in. of rain per annum, whilst great tracts of the Ural-Caspian depression, Arabia, and Persia, have less than 10 in. annually. Central A. receives from 2 to 5 in. only; S. Siberia and Manchuria from 25 to 50 in.; and the remainder between 10 in. and 25 in.

Flora and fauna.—The varying areas of vegetation naturally bear some correspondence to the climatic areas. The tundras, a name given to the immense stretches of boggy country whose vegetation is of an Arctic character, are found N. of the Arctic circle, and as far S. as 60° N. The cold temperate forests of larch, spruce, fir, and birch lie between 50° and 60° N. The Mediterranean flora, comprising the vine, the fig, the orange, the citron, and the pomegranate in fruits, and in trees the cedar, the cork, and the evergreen oak flourishes in A. Minor and Syria. Pistachios and junipers grow in the less arid parts of the plateaus of Iran and Arabia, and date palms in the desert oases. The central steppe and desert, and the low-lying Turan, Tarim, and Gobi regions, large tracts of which are covered with salt wastes or moving sand dunes, have grasses and composites in some parts, willows and poplars along the courses of the streams, and in the loftier areas tamarisks, poppies, ranunculi, and other small-leaved plants. The saksane is a characteristic shrub. The high mt. regions and chains are bare of trees. Meadows are, however, found in the N.E. parts of Tibet to a height of nearly 13,000 ft. Above this height are mostly deserts, with here and there a few saxifrages and pyrethra, whilst beyond the alt. of 14,500 ft. nothing is found but the everlasting snows. The valleys of the Pamirs have a scanty vegetation which extends to a much greater height, stunted trees having been found as far up as 23,000 ft. Deciduous forests cover the S.W. slopes of the Himalayas, whilst evergreens flourish on the S.E. The rich steppe land of the Amur region is distinguished by a vegetation which partakes of the nature both of that in the desert and that of the E. coast woodlands, and forms a transition region between the two. In Japan also two regions may be distinguished. The N. region has dense forests of deciduous trees, and thick undergrowth; the S. abounds in evergreen trees, such as camphor, laurels, etc. In the E. of the is. of the S.E. region the vegetation is more Australian in character, and eucalyptus trees predominate. The central mt. system separates very different floras. A mixed flora exists in Korea and Amuria, marking a transition between that of the Sino-Japanese region, and that of the Siberian country. The flora of Arabia has many points of resemblance to that of N. Africa.

The fauna of A. is separated by the great mt. system into two main divs., the palæarctic and the oriental, with a transitional region in the E. Many fur-bearing animals are found in the northern forests, whilst the Arctic waters are the home of the seal, the walrus, and other aquatic mammals. The land animals of this region include the reindeer, the polar bear, the arctic fox, the ermine, the arctic vole, the lemming, the musk-ox, and the brown bear; a few Kamchatkan sheep are still found in the extreme E. Such birds as the ptarmigan, the snow owl, and the guillemot are found. A different fauna characterises the steppe lands to the S. of the forests. Such domestic animals as the horse, the ass, and the camel are kept, and the argali, a large species of sheep which lives in the mountainous regions. Amongst the other animals are the jerboa, the marmot, sev. species of deer and gazelles, and a few tigers. The lofty plateau of Tibet is a special region from a zoological point of view, and has sev. species which are found in no other quarter, among them the yak, the wild ass, or 'kulan,' a distinct kind of argali known as 'Hodgson's,' from its discoverer, and some rodents. The Sino-Japanese region marks a transition in its fauna no less than its flora; many species of deer are found there, also monkeys and tigers. The sea-otter is found round the coast; the giant salamander is peculiar to Japan. The pheasant and the silk-worm, which have both been removed from their place of origin and bred with success elsewhere, originally came from China. There have been great changes in the fauna of A. since the glacial period, as observation of fossil remains has conclusively proved. Many species of animals have become extinct, amongst them the cave-bear, the wolf, the hyæna, the mammoth, and the hairy rhinoceros. Other species are fast dying out, and will in a short time be extinct unless steps are taken to secure the prolongation of their existence, among them the bison and the auroch.

Ethnography.—The peoples of A. may be divided into six different groups. The first is the Caucasian type, which is found in W. A., and in India. The second type, the Mongolian, inhabits Central and E. A., and the Indo-Chinese peninsula. The third, or Malay type, is found in Malacca, and the is. of the Indian Archipelago. The Dravidas, who

form the fourth type, are found in S. E. India, and in Ceylon. The Negritos and Papuas, who dwell in the virgin forests of the Philippines and the Celebes, form a fifth type. The sixth type, the Hyperboreans in N.E. A., are somewhat of a puzzle to ethnologists, and their affinities have not yet been traced. The first three types above-mentioned are numerically by far the most important, and form practically the whole population, the numbers of the Dravidas, Negritos, and Hyperboreans being so small as to be negligible for statistical purposes. It may, then, be said that the Mongolian race forms seven-tenths of the population, the Malay one-fifth, and the Caucasian a tenth part. Another div. of the whole pop. might be made on linguistic lines, four great branches may be observed, each with numerous sub-divisions. The Ural-Altaians, or Finno-Tartars, form one group, which may be further sub-divided into (a) Samoyedic tribes, (b) Finnish, (c) Turco-Tartars, (d) Mongols proper, (e) Manchurians and Tunguses. The next two groups belong to the same main category of polysyllabic peoples, the Japanese forming one, the Coreans the other. The other main group is composed of monosyllabic nations, sub-divided into (a) Chinese, (b) Tibetans, (c) Himalayan tribes, (d) Siamese, (e) Burmese, (f) Annamese, (g) Sifars, etc. The use of the terms 'Asiatic' and 'Oriental,' as if they each denoted a clearly-defined and homogeneous type, is somewhat misleading. The different Asiatic races differ very remarkably, and no underlying and unifying resemblace can be said to exist. They stand on a level between the natives of Africa and America and those of Europe. The point of mental resemblance which may be observed in Asiatics, as opposed to Europeans, is the conviction of the unimportance of the individual. He is always considered as a member of some larger and more important body, uch as the state or tribe, rather than s a separate and unfettered entity. he result of this mode of thought in olitics is despotism, in religion a signed determinism. It is chiefly e to this attitude that the history of has large and simple outlines.

History and language.—Few reins of prehistoric man have as yet en discovered in A., but a sufficient nber of stone and bronze implents have been found in various ts of India to indicate the simiy in all regions of the first steps vilisation of the human race. The amount of knowledge which has gathered concerning the earliest ry of the Aryan race shows it as a pastoral people occupyi valleys and mountains alon course of the R. Oxus. The S races, distributed from Syria t Euphrates and Persia, and pe farther E., were their neighbou the S. These two races in the c of time extended across S. Eu N. Africa, and S.W. A. The Sem gave their language to Arabia, Sy and N. Africa; whilst the Ar speech gained prevalence over greater part of Europe and the te perato zone of A., reaching from Mediterranean to India. The intr sions of the Aryans into the Semi regions are supposed to have be caused by pressure from Mongolia tribes on the N., and changes in cl mate. As an instance of such an in trusion, the invasion of Upper Indi by the Brahminical race may be cited As the Aryan language developed into Sanskrit in India, so in Persia it gave birth to 'divine, high-piping Pehlehvi,' or Zendic, the language of the sacred books of the fire-worshippers. In India the Aryans seem to have borrowed the Dravidian letters, as in Persia they adopted those of the ancient Assyrians. The Hellenic races which were a European offshoot of the Aryans, also seem to have possessed no alphabet of their own, and have borrowed a Semitic one from the Phœnicians. Until about 250 B.C. the Bactrian Aryans used an archaic quasi-Phœnician alphabet; at that period the Pali letters, which form the basis of the Devanagari alphabet, are known to have been in use.

The races formerly occupying the plains of Iraq, and the mts. adjacent, the Babylonians and Assyrians, are, with the sole exception of the Egyptians, those whose inscriptions and monuments supply the earliest definite records of mankind. These records go to show that powerful kings then ruled over those countries, and that frequent changes in the boundaries of the separate states took place,—a state of affairs which lasted as long as the kingdoms themselves continued to exist. It is, of course, impossible to say with any exactitude how long these nations may have been in arriving at such a state of civilisation, but there in no reason to suppose that the course of evolution was any more rapid then than now. We can therefore surmise with certainty that long before 1500 B.C. the Babylonians and Assyrians had attained to a considerable amount of civilisation, but with the exception of these races, no idea can be formed as to what was the condition of the continent before that date. The advance of the Chinese along the Hwang Ho, which synchronises

followed by the Spaniards, Dutch, French, Danes, and British. The Mongol dynasty, however, was the chief power in India from early in the sixteenth century till late in the seventeenth. During this period the various European nations had been making some progress, and when the Mongol dynasty finally declined before Mahratta and Afghan onslaughts, the long struggle for the rule of India among Asiatic races—pre-Aryan, Aryan, Afghan, and Mogul—was destined to end in European supremacy. In the struggle between the European races the British after a struggle overcame their most formidable competitors, the French, and at length took possession of the whole of the peninsula with the exception of a few places on the sea coast. Russia, in the course of a few centuries, beginning with the conquest of Siberia by the Cossacks between 1580 and 1584, conquered and partly colonised the most favourable parts of the N.W. slope of the lofty plateau of A., and reached the Pacific across its narrow extremity in the N.E. An extensive ter. in Farther India has of late years been taken possession of by France. China has sunk into a subordinate place, after having been regarded as the third power in A. The war with Japan in 1894–5 showed her weakness; recent events in China, both before and after the Great War, however, appear to indicate that an awakening is taking place in that country also. Japan is now the foremost Asiatic native power, having made wonderful progress in civilisation during the last sixty years, and showing remarkable aptitude in assimilating the material civilisation, and to some extent the institutions, of Europe.

It is worthy of note that not only ne great and most influential religions of the world—Buddhism, ristianity, Mohammedanism—but so those of secondary importance, ch as Judaism, Parseeism, Taoism, ve all had their origin in A. An ystematic paganism represents highest religious achievement of rope, Gk. philosophy, though very anced, not being a religion in the sense of the word. On the other d, Roman Catholic Christianity ns but few Asiatic elements, gh its origin and essential ideas siatic. Christianity, thus made pean, has made but little pro- E. of A. Minor, nor has Budd- made headway W. thereof, Mohammedanism is repugnant opeans. It is indeed clear that igious feeling and sentiment of d Europe are radically dis- The mental constitution of the Asiatic, too, is less easily cha than his institutions, which lead speculation as to the ultimate e of the far-reaching changes, w have of late years taken place in The life of the people must indeed changed thereby, but the question whether the characteristics, the p sonality, of the race, will be chang also. That question time alone c answer.

Asia Minor, Anatolia, or Anadoli, the name applied to the portion o W. Asia, which, projecting from the main mass of the continent forms a W. peninsula of it. In shape the peninsula is oblong. The name Anatolia, first used in the tenth century, concerning only a part of A. M., was applied to the country under the Byzantine emperors and is retained under the form Anadoli by modern Turks. The boundaries of A. M. before the Great War were the Black Sea on the N., the Aegean Sea on the W., and the Mediterranean on the S. The boundary on the E. was arbitrary; for geographical purposes it could be taken to be a line starting from the Gulf of Scanderoon, along the mt. ranges to a point on the Euphrates between Samosata and Malatijeh, thence along the course of the Euphrates to near Erzingan and then to the Black Sea, E. of Trebizond. In 1920, except for a small area around Chanak, on the Dardanelles, the whole of A. M., in spite of the defeat of Turkey in the Great War, had fallen under the rule of the *de facto* Government established at Angora with the style of the Government of the Gran National Assembly of Turkey. Thi Government in 1923 became the Turkish Republic under the presidency of Kemal (*see* TURKEY), who had completely defeated the Gks. in A. M. (*see* later in this article), so that all the territory previously conquered by the Gk. protagonists of dreams of Magna Graecia was again in the hands of the Turks. By the Treaty of Lausanne 1923 (ratified by the Allied Powers in 1924) Turkey was given the whole of A. M. comprised within the Caucasian frontier (as defined by the Treaty of Kars, 1921), the N. part of the old Turco-Persian frontier, the Turco-Iraq frontier, and the boundary between Turkey and Syria from Jezira-ibn-Oman on the Tigris to a point S. of Payas on the Gulf of Alexandretta. This delimitation excludes Batoum and Mosul, but includes portions of the three sanjaks of Kars, Ardehan and Artuin under the Treaty concluded in 1921 with the Caucasian States. The peninsula consists for the most part of a tableland with an average height of about

tribes who differed but little from each other. Much light has of late years been thrown on the civilisation of the Hittites or Syro-Cappadocians, the centre of whose power is supposed to have been Boghaz Keui. The date of the great Aryan immigration into A. M. from Europe is unknown, but it was declining in the eleventh and tenth centuries B.C. The kingdom of Lydia was the next to obtain supremacy, and following the fall of Lydia in 546 B.C., the Persians became rulers. In 334 B.C. Alexander the Great invaded A. M., but following his death the Seleucan dynasty was the most powerful in A. M., though it never held sway over the whole of the country. Then by degrees Rome conquered practically the whole of A. M., and was the dominant power when Christianity was introduced there. With the introduction of Christianity a great advance took place. The old religions and languages disappeared, and the people, with one language and one religion, began to have a united identity. In the sixth century A. M. was rich and prosperous. From the sixth to the tenth centuries Persian and Arab raids took place, and in the eleventh century the Seljuk Turks became the chief power. Then the Mongol power gained the ascendency in the thirteenth century, and with the decline of the Mongol power the Osmanli Turks of Brusa gained the ascendency from 1307. Tamerlane swept through the country in 1402, and though the Osmanli supremacy was finally re-established, it was after a lengthy contest. The defeat of the Emperor Romanus in 1071 marks the beginning of a new era for A. M. The prosperity and peace of the previous centuries came to an end then, and the country was for long years the prey of wandering tribes of nomads. These wandered through the country, caring nothing for any agricultural or urban pursuits, and left the land bare behind them. The ravages caused by Timur in his raid were enormous, and the country has never recovered completely therefrom. The earliest Osmanli sultans enforced the Turkish language, and to a large extent the religion of Islam, on the conquered, and from that time the last traces of y. civilisation disappear in A. M. But, after many years of retrogression, the large Gk. increase—since the Great War somewhat discounted—in the W., the establishment of railways, and the spread of German and Russian interests in the peninsula, all had their effect in turning the tide. Since the Great War, the reforms of Mustapha Kemal have accelerated this process. *History during and since the Great War.*—In the Great War there was heavy fighting in A. M. between the Turks and Russians in Armenia (see under ARMENIA). Pending the readjustment of Turkey's boundaries after the Armistice, a mixed British and Gk. force occupied Smyrna. The geographical limits of the territory adjacent to Smyrna and the frontiers of Turkey in Asia generally were laid down in the Treaty of Sèvres (1920). Under the Treaty Greece had accepted a mandate for the occupation and administration of the tn. and dist. of Smyrna. But the rise of the Nationalist Movement in A. M. revived Turkish hopes of stultifying the Treaty, which, though signed, was never ratified. A strong *de facto* Government came into power under Mustapha Kemal, with its capital at Angora. The Gks., buoyed up by the moral support of the Coalition Government in England, launched an offensive in A. M. in March 1921. Defeated near Eskishehr, they withdrew towards Ushak in April; they resumed the offensive from Ushak and Brusa in July, and in that month entered Eskishehr. The Turks fell back on the Sakharia riv. to defend Angora, and the Gks., rashly advancing on the capital, were heavily defeated in September, and taking up a new line at Eskishehr repulsed Turkish attacks at Afion Kara Hissar in October. In July 1922 the Turks opened a well-prepared offensive, and within two months the Gks. were in headlong flight, and, by September, Kemal had recovered the mandated region. Smyrna was hastily evacuated, and the city consigned to flames by the victorious Turks who massacred a large part of the Gk. population in A. M. The final territorial adjustment was made by the Treaty of Lausanne (1923). Turkey in Asia now comprises the whole of A. M., and includes Cilicia, which was handed over to the Kemalist forces by the French in 1922. The whole pop. of A. M. was considerably reduced by the exodus of Gks. and Armenians which ensued on the fall of Smyrna.

Asiago, an It. tn. in the prov. of Vicenza, cap. of the *Sette Communi*, or Seven Communes. Pop. 2832.

Asiago Plateau. Some of the heaviest fighting on the Italian front in the Great War took place on the Asiago Plateau, notably in the anxious period of the Austro-Hungarian invasion of Italy in Oct. to Dec. 1917. The Austro-German forces having taken General Cadorna's headquarters at Udine on Oct. 30, and, foiled in the effort to force a crossing of the Lower Piave, tried to outflank the new Italian lines, which, however, had been reinforced

...by British and French troops, by a direct assault on the A. plateau and mountains between the Brenta and Piave. Large bodies of Austro-German troops were flung in vain against the mountain masses, but, though the Italians gave up some of the ground, the effort to reach the Venetian plains failed. In the following December, the Austro-German forces made a further and desperate attack on the plateau and the upper reaches of the Brenta. Monte Asolone and the summits of Monte Tomba fell to them; but both, together with the Piave bridgehead at Zenson, were retaken by the Italians in January 1918, and their positions on the plateau consolidated. The net effect of the Italian setback on the Piave was salutary in that it knit the Italian people together in a firm and patriotic resolve to reform their Army and purge their country of treasonable elements.

Asiatic Quarterly, a review, the full title of which now is *The Imperial and Asiatic Quarterly Review and Oriental and Colonial Record*, pub. by the Colonial Institute at Woking. It was founded in 1886 to deal with questions of Indian and general Oriental interest, and its scope was extended in 1891 to include African and Colonial subjects.

Asiatic Society, The Royal, 74, Grosvenor Street, London, W. 1. An institution formed for the furtherance of Indian and Oriental studies. Monthly meetings are held every year from October to June inclusive, and at these gatherings papers on recent research and discoveries, and on cognate subjects, are read by highly-qualified and travelled authorities. The A. S. also issues learned publications on Oriental subjects. The President (...) is the Marquess of Zetland, ...I., and the Sec. is Mrs. R. W. ...r.

Asiatic Turkey, *see* Asia Minor; ...ey.

...ius, *see* Pollio, Caius Asinius.

...garh, a fortress in the Central ... of India. It is situated 300 m. ... Bombay. Its position on an ... mt. of the Satpuras gives it ... advantages for fortification. ... been captured by the British ...

...ad, or Askhabad, *see* Pol...

... Robert (*d.* 1537), an Eng. ...der of the 'Pilgrimage of ... He was hanged in chains at ...unishment for complicity in ... A promise to give up the ... of no avail.

...n, a small Irish tn. in the ...erick. Pop. about 800.

... Johan Kristoffer (1787–1848), Swedish publicist. In 1802 he founded *Polyfem*, the chief literary organ of the new romantic school. The title was adopted for the party. In 1830 he became editor of *Svenska Minerva*, a Conservative paper.

Askew, Anne (1521–46), an Eng. martyr to Protestantism, *b.* at Stollingborough. The vigour with which she upheld her own faith caused her torture and subsequent death by burning at Smithfield.

Askew, Anthony (1722–72), a native of Westmorland. As a classical scholar, however, he is better known than as a doctor. He was educated at the Grammar School, Newcastle-on-Tyne, and later at Cambridge. He published a vol. of Gk. inscriptions domiciled at present in the British Museum.

Askja, a volcano of Iceland. It possesses a huge crater measuring 17 m. in circumference, and rises from a bed of lava called Odátharaun. It is the largest volcano in the island. It throws forth volumes of steam incessantly, and by many eruptions has built up a mt. 4633 ft. high.

Askwith, Lord (George) (*b.* 1861), Chief Industrial Commissioner before and during the Great War. Counsel on the Venezuelan Arbitration and also for the Crown in peerage claims. At the Board of Trade rendered valuable services in advisory capacity in labour disputes and railway questions. His conciliatory policy settled many strikes and lock-outs, notably the cotton dispute of 1910 and the still more serious transport workers' strike of 1911. During the Great War was Chairman of the Govt. Arbitration Committee under the Munitions Acts. Created a peer in 1919. Holds various university and other scholastic posts. Pub.: *Industrial Problems and Disputes*, 1920; *British Taverns, their History and Laws*, 1928; *Lord James of Hereford*, 1930.

Asmara, a tn. of Abyssinia, Africa, about 50 m. S.W. of Massowa. It is the seat of governmental residence of the Italian colony of Eritrea.

Asmodeus, an evil genius of Heb. tradition, sometimes associated with Beelzebub or Apollyon. He is mentioned in connection with Solomon in the Talmud. He has often been termed the spirit of matrimonial jealousy, from a chronicle in the apocryphal book of Tobit. Here he slays the seven successive husbands of the beautiful Sara, daughter of Rag... because of his own love for her. In *Diable Boiteux* Le Sage makes h... the chief character.

Asmoneans, the original name ... the Maccabees, a family of hero... who delivered Judæa from the o...

pression of Antiochus Epiphanes, King of Syria (175–164 B.C.). Their history is to be found in the books of the Maccabees, the last two books of the Apocrypha.

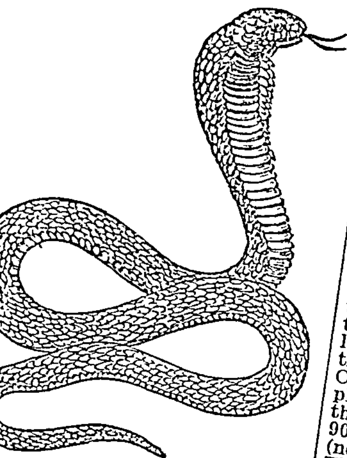
Asnières, French tn. in dept. of Seine, near St. Denis. Great boating centre for Parisians. Manufs. bicycles, perfumery, and pianos. Pop. 52,609.

Asnyk, Adam (1838–97), Polish poet and dramatist, *b.* at Kalisch. He studied medicine and philosophy at the universities of Warsaw, Breslau, and Heidelberg, graduating as a doctor in 1866. His chief dramatic writings are: *Cola Rienzi* (1869), a tragedy; *Kiejstut* (1878); *Przyjaciele Hioba*, *i.e.* The Friends of Job (1879).

Asoca, or *Jonesia asoca*, a tropical plant of the order Leguminosæ often mentioned in Indian mythology.

Asolo, an anct. city of Venetia. Its situation on the hills enables it to boast a magnificent view over the plains to Venice. Its anct. walls and turreted buildings give it a picturesque appearance. In his *Asolando* Browning celebrates the place, and it possesses associations in connection with Caterina Cornaro, Queen of Cyprus, and also memories of Canova. Pop. 5847.

Asp, an ophidian reptile closely related to the British adder, properly



ASP

... *Vipera aspis*, of the family ...æ; it is found in S. Europe, ...rm is also loosely applied to ...nakes, as the *Naja haje*, the spy-slange of Africa, of the fam... Colubridæ. Cleopatra's asp was p... bably *Cerastes cornutus* or horn... viper, of the family Viperidæ, fou... in Arabia, N. Africa, and Syria.

Aspalathos, or Spalato, a seaport ... Dalmatia, on a peninsula projecti... into the Adriatic, 74 m. S.E. of Zara... It has an excellent harbour, a larg... export trade in wine and manufs. o... wool and silk. It is an episcopa... seat and has a fine cathedral and numerous remains of antiquities. Pop. 26,198.

Asparagus, a genus of Liliaceæ, growing in Asia and S. Europe. The young shoots of *A. officinalis* form a succulent vegetable, frequently forced in Britain and Russia.

Asparagus Stone is a variety of apatite (*q.v.*), a mineral which is formed chiefly of phosphate of lime.

Aspasia: (1) A courtesan of Athens of the fifth century. In 445 Pericles, after divorcing his wife, made her his mistress, and later was able by his influence to legitimise a son he had by her. She is believed to have had considerable influence over him, and in the opinion of some authorities the Samian and Peloponnesian wars are attributed to her. On the death of Pericles she became the mistress of Lysicles, who *d.* a year after Pericles in 428. There is a bust of her in the Vatican. (2) A Gk. peripatetic philosoher who commented on Aristotle at great length. Later writers refer frequently to his remarks upon the *Categories*, *De Interpretatione*, and *De Sensu*, but the works themselves are lost, as also are commentaries upon Plato. However, copies of the commentaries on parts of the *Nicomachean Ethics* are extant. He flourished probably about the first century A.D.

Aspe, a tn. in the prov. of Alicante, Spain, and situated 21 m. W. of the town of Alicante. It has a trade in ore and wine. Pop. 7650.

Aspect, in astronomy, a position of the planets in certain relative distances. During the vogue of astrology there were five: conjunction, sextile, quartile, trine, and opposition. Conjunction is applied when two planets are in the same lat.; when they are 60° apart they are sextile, 90° quartile, 120° trine, and at 180° (necessarily opposite) in opposition. The only two terms surviving are conjunction and opposition.

Aspen, a species of Salicaceæ, grows in colder countries. It belongs to the genus *Populus* (*q.v.*), and its scientific name is *P. tremula*.

Aspen, co. seat of Pitkin co., Col., U.S.A., in Roaring Fork Valley. Silver mines in the vicinity. Pop. 2000.

Asper is the name of a Turkish

money of account. The name means 'white,' and is probably derived from the whiteness of newly coined silver. The A. was a silver coin of very small value, 120 being required to equal in value a piastre.

Asper, Hans (1499–1571), a Swiss natural history and portrait painter, *b.* at Zurich; a contemporary of Holbein, and influenced by him in his work.

Asperges, the ceremony of sprinkling people with holy water before mass. It is observed in the Roman Catholic Church, and derives its name from the first word of the incantation *Asperges me, Domini*, etc. The vessel used to hold the water is an aspersorium, while the anointing brush is called an aspergil. The sprinkling of the oil itself is called an aspersion.

Aspergillum, a genus of molluscs of the family Clavagellidæ and order Eulamellibranchiata. *A. Javanum*, the watering-pot shell, is so called from its shape, the bivalve shell occurring at the end of a perforated shelly tube.

Aspergillus, a minute fungus of order Pyrenomycetes and family Perisporieæ; it belongs to the div. Ascomycetes. This fungus, *Eurotium A.*, is the mould often seen on jam exposed to the air.

Aspern, a small vil. of Austria, on the Danube near Vienna. In 1809 a desperate and bloody affray occurred there between Napoleon and the Archduke Charles, resulting in a defeat of the French. The loss of life amounted to 54,000.

Aspertini, Amico (1475–1532), a Bolognese painter, was *b.* at Bologna. He was a pupil of Francesco Francia, and imitated the painters of different periods, though this did not prevent ...s criticising very harshly the imita...rs of Raphael. He excelled at ...inting frescoes, and decorated a ...ge number of buildings, but his ...aracter was more original than his ...ent, for he painted with both ...nds at once. He also tried sculp...e and engraving, but without any ...cess.

...sperula, a widespread genus of ...iaceæ. There are two British ...ies, *A. odorata*, the woodruff, and ...*nanchica*, the squinancy-wort.

...phalt, a naturally-occurring form ...tumen. It consists of a mixture ...dro-carbons, the elements car... hydrogen, oxygen, nitrogen, and ...ur being present. The manner ...ich the deposits are produced is ...ter of some doubt, but they are ...bly formed by the oxidation ...aporation of liquid petroleum ... has found its way from sur...ng outcrops of petroleum... strata. The best known ..., is the 'Pitch Lake at La Brea, in the S.W. corner of the Is... Trinidad, which covers an area ... about 100 ac. It was known from ... very early period, for the buccane... caulked their ships with the materi... and is now worked by the New Tri...dad Asphalt Company, who expo... about 150,000 tons annually. Othe... deposits of A., somewhat different i... composition, are found in Venezuela... Cuba, the Dead Sea, and Switzerland... That found at Val de Travers i... Switzerland is really a bituminous limestone, and is largely used for preparing 'A. mastic,' which contains a great proportion of limestone, and is much in demand in the form of blocks for street paving and floors. A. is also used for 'damp courses' in the walls of houses, for preparing waterproof flooring and roofing, and as an ingredient in Japan varnish. An artificial A. is made from coal-tar pitch, and for some purposes is an efficient substitute for the naturally-occurring substance.

Asphalters' Work (in building, *q.v.*), courses of asphalt, at least ¼ in. thick, are laid on brick or masonry walls just above the ground level, or prevent the damp from rising; underneath buildings to exclude ground air; on flat roofs, etc.

Asphaltites Laws, *see* Dead Sea.

Asphodelus, a genus of Liliaceæ which grows in S. Europe. *A. albus*, the white asphodel, is found near the Mediterranean; *A. luteus*, the yellow asphodel, has red berries, and is found wild in Sicily, Dalmatia, the Peloponnesus, and the Crimea.

Asphyxia (Gk., pulselessness), the suspension of vital phenomena due to absence of the requisite proportion of oxygen in the lungs. The condition may be brought about by any obstruction to the passage of air to and from the lung, as in drowning, constriction of the windpipe or the presence of foreign bodies or morbid growths in the air passages; or an insufficient supply of oxygen in the atmosphere breathed; or any interference with the muscular actions which produce breathing, such as may be occasioned by paralysis or great pressure on the walls of the chest and abdomen. In the lungs a continual exchange of gases goes on, oxygen being absorbed and carried to the tissues by the blood, and carbon dioxide being formed by the decomposition of carbonates in the blood. The proportion of carbon dioxide in the air of the lungs remains fairly constant, and this proportion can only be maintained by the inspiration of air rich in oxygen and the expiration of air with a relatively large proportion of carbon dioxide. If there is need for a larger consumption of

oxygen, as during muscular exertion, the breathing becomes quicker and deeper; and it is also found that excess of carbon dioxide tends to stimulate the breathing, so that the actual proportions of the gases in the air of the lungs do not alter although the outer air be vitiated. If, however, the supply of air is so restricted or vitiated that the proportion of carbon dioxide within the lung increases, symptoms such as headache and nausea immediately present themselves, the skin takes on a blue tinge, and as the percentage increases consciousness is lost, respiration ceases altogether, and finally the heart stops beating.

The treatment in case of A. consists of first removing the cause and then resorting to artificial respiration. If the cause be inhalation of bad air, the patient must be at once removed to the open air, and the clothing about the neck, chest, and waist loosened. When choking is threatened through the presence of a foreign body in the air passages, an effort should immediately be made to dislodge it by means of the fingers, as there is risk of sudden A. An attack of vomiting or coughing may also succeed in ejecting the obstacle; or if a surgeon be at hand and the urgency of the symptoms demand it, laryngotomy or tracheotomy, according to the position of the obstacle, may allow air to pass to the lungs.

Asphyxiants are chemical substances which have a poisonous effect on the human system, producing suffocation. Many of them are used in the manufacture of ammunition.

Aspic is the name given to the ...nsparent, light-coloured jelly in ...ich fish, meat, etc., are sometimes ...ved.

...spidistra is a small genus of ...atic Liliaceæ. It has broad leaves, ... the species *A. elatior* is often ...vated in Britain as a hot-house ...t.

...pidium, the shield-fern, is a genus ...rns of the order Polypodiaceæ. ...*ilix-mas*, or *Nephrodium Filix-* ... the male fern, grows in woods ...as anthelmintic properties; *A.* ...*fœmina* is the lady-fern; *A.* ...*tis* the holly-fern; *A. aculea-* ...e prickly shield-fern.

...dura, a fossil genus of echino...of the order Ophiureæ. These ...stars, related to star-fishes, ...d in Ger. muschelkalk.

...wall, *see* COLON.

...wall, William H. (1807–75), ...n railway builder, *b.* in New ...n 1837 a partner in the ship... of Howland & Aspinwall. ...he left this to construct the ...Railway across the Isthmus. It was completed in 1855, and t... eastern terminus was named after hi... He was one of the founders of th... Pacific Mail Steamship Company.

Aspirate (Lat. *spiro*, I breathe)... It denotes a sharply defined audibl... breath, and as such signifies in Eng... grammar the letter *h*. In Gk. the ... 'spiritus asper,' or 'rough breathing,' ... mark, when placed over an initial vowel has the effect of prefixing an H in the reading or pronouncing of the word. Besides its significance in Eng. it is also used in application to two classes of consonants, *i.e.* those blended with *h*, as in the Sanskrit or those followed by *h* in English in examples like *th* and *ch* with *f* and *v*. Thus in the latter and broader sense of the term eight of the sixteen Eng. mute sounds are *lene*, *i.e.*, possessing their corresponding aspirate.

Aspirator, an apparatus used for drawing air or other gases through vessels connected with it. The simplest form consists of a large bottle filled with water, and supplied with a stop-cock at the bottom. The apparatus through which the gas is to be drawn is connected with the neck of the bottle and the stop-cock is opened. As the water flows out of the bottle, air or gas flows in to take its place through the only available channel, that is, through the apparatus connected with the aspirator.

Another form of A. consists of a narrow tube connected with a supply of water under pressure. This jet is surrounded by another tube closed at the top and connected laterally with the vessel from which the air is to be withdrawn. Air is carried down with the jet so that a continuous current is set up from the vessel to be exhausted.

Aspirin. The trade name for acetylsalicylic acid, formula $C_9H_8O_4$. It is also known as acidum acetosalicum or salacetin, and is made through the action of acetic anhydride on salicylic acid. Though first introduced into medicine under the name of A., other trade names are Genasprin and Salaspin, and there are many others. The dose is from 5 to 15 grains, and it is prescribed for rheumatic fever to reduce temperature and it is a widely-used remedy for neuralgia and headaches. It has the same action as salicylic acid, but is not so prone to producing such secondary effects as gastric disturbance. Care is to be taken to avoid exposure after administration, as perspiration often follows the dose.

Aspland, Robert (1782–1845), Unitarian divine. He was originally intended for the Baptist ministry, but was expelled from that body in 1800 for 'unsoundness,' and entered business, doing 'supply' preaching on

Lords. The 'ploughing of the sands' was to cease. A futile conference, broken by the death of Edward VII. and followed by a general election, Nov. 1910, failed, and a Veto Bill was introduced and passed, after a threat of creation of peers had led to the withdrawal of the official opposition. In 1911, Mr. A. being premier for the third time, was passed an Insurance Act, and in 1912 Bills for the Better Government of Ireland and Welsh Disestablishment were introduced.

The dominating issue in politics in the years immediately preceding the Great War, while A. was as yet Premier, was Irish Home Rule. A. would allow nothing to compromise Liberal policy in this issue. Female suffrage, rightly or wrongly, was supposed to be prejudicial to the Home Rule champions. Hence on the suffrage issue, the whole Nationalist Party under Redmond, rallied to the A. banner and the Plural Voting Bill, in spite of Mr. A.'s negative pledge to the suffragettes 'not to use his personal influence against them,' was, fortuitously for the Home Rule Bill, lost. Then came the historic Curragh incident (*see* CURRAGH INCIDENT). Colonel Seeley, then War Minister, resigned and Mr. A. abruptly announced, to a deliriously enthusiastic House, that he proposed to act as War Minister himself. His prestige never stood higher. He handled the situation with wonderful tact and high strategical skill. Negotiations were now continued for finding some *via media* which would give S. Ireland Home Rule, and at the same time meet the objections of such parts of Ulster as were affected. In March 1914 Mr. A. announced his readiness to give to each Ulster county the option of excluding itself from the Irish Parliament, which option had to be exercised within six years. This time-limit acted as a cold douche to the apparent harmony be-een coalition and Irish Unionists. hile this Bill made steady progress wards the Statute Book, treason s as steadily being fomented in ter, especially by the importation rms and the formation of the Irish onal volunteers. In this de-able conjuncture, the King on the ce of Mr. A., summoned a Con-ce of Party leaders to meet at ingham Palace. But no settle- was reached. The situation d to be more hopeless. None say what might happen, when nd every other question of l politics became submerged enormous cataclysm of the War. Mr. A. was essentially n to hold all parties together, as ever free from the slightest taint of pettiness and a leade consummate tactfulness. He signed the War Ministry to Kitchener and devoted his ener to securing the solidarity of the co try against the common ene There still remained some difficu anent the Home Rule Bill, whic under the Parliament Act, was n ready for the Royal signature. the Statute Book the Nationalis demanded that the Bill should go, bu the Ulster members asserted that th would be to violate the political truc agreed upon. A similar conflict raged on the fate of the Welsh Disestablishment Bill. The threatened rift in the Cabinet itself was, however, closed by A. announcing that the Government intended to put both Bills on the Statute Book and to prorogue Parliament for a few days. Next day (Sept. 15) Mr. A. brought in a bill the purpose of which was, while securing the placing of the Bills on the Book, to postpone their operation for at least a year until the war was over.

As a peace Prime Minister, Mr. A. had revealed great qualities as a debater and much dexterity as a Party leader. Put to the test of war, he showed, at all events in the earlier months, none of the indecision which seemed at a later stage to characterise his policy towards the questions of conscription and the shell shortage. His speeches were admirable expositions of the purposes for which the country was fighting. On the munitions question, which was destined to prove his downfall, there was believed to be a marked, and indeed bitter, difference of opinion between Lord Kitchener and Sir John French (later Earl Ypres) on the kind of ammunition that was suitable. The assumption was without any foundation whatever. French had been denied nothing. The outcome of the matter, however, was Mr. A.'s suggestion that the interests of the nation were probably better served by the substitution of a non-Party Government, and the consequence was a Coalition Government drawn from all parts of the House. The Irish Nationalist leader was even offered a post in the Cabinet, but he refused, though not on any ground of difference of opinion on the war policy. Then came the Irish Rebellion of 1916. After the execution of the ringleaders, Mr. A. visited Ireland in the hope of laying the foundations for an honourable settlement. Negotiations were set on foot between the leaders of the opposed Irish factions, Mr. Lloyd George being the Government intermediary. A compromise was reached, but soon afterwards wrecked through the influence of the Unionist Wing of the Coalition Ministry. Among the

Unionists at this time conviction was growing that if the war was to be won, Mr. A. should be superseded. The first blow was dealt by Mr. Lloyd George by his proposal of a War Council from which the Prime Minister should be excluded, an exclusion which he defended on the ground that the independence of opinion from Party influence would thereby be secured. Mr. A. consented, but yielding to the importunity of his friends, afterwards withdrew his consent. Mr. Lloyd George retaliated by sending in his resignation. Then Mr. Bonar Law and the other Unionist members of the Cabinet gave notice to Mr. A. that they were no longer willing to co-operate with him and he was thus forced into resignation, and Mr. Lloyd George displaced him as Prime Minister (1916). This was really the end of Mr. A.'s long and distinguished record as a Minister of the Crown. Apart altogether from the Home Rule imbroglio, the true cause of Mr. A.'s downfall was his real or fancied inability to handle the shell-shortage problem. Colonel Repington, the *Times* military correspondent, had made in spite of the Press Censorship a public revelation of the seriousness of this shortage, in which disclosure he was acting at the instigation of the entire Northcliffe Press. It is probable the move was a wise one, though it would seem to redound to Mr. A.'s almost proverbial austerity and probity of character that nothing would compel him to truckle to the manufacturers. Where he failed Mr. Lloyd George succeeded. The munitions were forthcoming—if at a huge price to the nation—and the war was won. But the transfer of power from the leader to his lieutenant naturally brought with it the bitterest acrimony between their respective adherents, and the cleavage was never made good. The historic Liberal Party dwindled to nothing, and it was only in 1928 that it began to show signs of revival. (*See* LIBERALISM.)

In the 1918 'Khaki' election, Mr. A. was defeated for Fife, and found himself in the anomalous position of being leader of the Liberal Party, and custodian of its funds, yet apparently without the possibility of being returned to the Commons. About this time, Mr. Lloyd George was seeking to form a new party comprising the more moderate elements of Liberalism and the more progressive elements of Conservatism. He was, in fact, seeking to consolidate his line of retreat against the time when he too would be left in the political wilderness, though as yet he was supreme as Coalition Premier. Ultimately Mr. A. was returned for Paisley exto[rting] the admiration even of his pol[itical] opponents by the wonderful vigo[ur of] his election campaign. Back in [the] House, he endeavoured by all hi[s] arts to undermine the position [of] Mr. Lloyd George. That ava[iled] nothing, and when at last the Co[ali]tion fell, the common disaster [in]duced the two warring sections of [the] Liberal Party to reach a comprom[ise] whereby Mr. A. was accepted [as] leader with Mr. Lloyd George as [his] chief lieutenant, but hardly *fid[us]* *Achates*. Mr. A.'s popularity a[nd] authority had now a fresh lease of li[fe,] and when Mr. Baldwin in 1922 com[mitted] mitted the fatal blunder of joinin[g] battle over the Free Trade an[d] Tariff issue, Mr. A. exploited th[e] situation with his accustomed power[s] of strategy and argument. Bu[t,] unfortunately for Liberalism, when Mr. A. was again returned for Paisley he found that the political battlefield had changed. There was a third Richmond in the field—the Labour Party. In combination with the Labour Party the Liberals could turn Mr. Baldwin out of office. In the result Mr. A. announced that he considered it to be his duty to help the Labour Party into power, but that he would withdraw his support if it should commit what the Liberals considered extravagances. (*See* LABOUR PARTY.) The Conservatives never forgave Mr. A. for this apparent playing into the hands of the Socialists, and the brief inglorious eight months' reign of Mr. Ramsay MacDonald's first Government was followed by the return of a Conservative Government with a tremen[illegible] Mr. A., though [illegible] without a seat, once again found his career, he being then over seventy years of age, and there seemed next to no certainty of his getting one. But an impossible situation was removed in February 1925, when he was raised to the Upper House, with the title of Earl of Oxford and Asquith, and a few weeks later he was made a Knight of the Garter. This left Mr. Lloyd George as leader of the Liberal Party, but the assumption that differences between him and Mr. A. had been healed was dispelled during the General Strike of 1926, when, after the collapse of the strike, Lord Oxford created a sensation by charging Mr. Lloyd George with pursuing a policy of his own towards the strike uncountenanced by his colleagues. The Liberal Press, however, supported Mr. Lloyd George not so much because they cared whether either Lord Oxford or Mr. Lloyd George was right in the dispute, but because it was

essential to have Liberal unity at almost any price. But the quarrel had had its effect on Lord Oxford. He had a stroke of angina pectoris, which, though slight, heralded the end of his great energies, and he died at Sutton Courtenay on February 15th, 1928. Unlike so many of his contemporaries, he abstained in his lifetime from literary reminiscences; but his *Memories and Reflections*, published a few months after his death, contain well-balanced comments on some of the great events in his long political experience and characteristically restrained observations on the men of his time, whether of his own political faith or not.

Ass, a general name for the genus *Asinus* of the horse-tribe. It differs somewhat from the horse in having a tuft of hair at the end of its tail, in having no worts on its hind legs, and in the presence of stripes, which are absent in the domestic A. Its characteristics are long ears and an upright mane, together with a proverbial stupidity. The Egyptians used the head of an A. to signify the sign of extreme dullness. It is only fair to add on behalf of the A. that this celebrated stupidity is more superstitious than actual. Although the domestication of the A. took place at a very early date, the common 'donkey' was not introduced into England till the time of Elizabeth. The animal is particularly adapted for transport purposes on account of its surprising hardihood, endurance, and docility when treated kindly. The usually wretched specimens seen in England are more the result of bad treatment than naturally so. In Arabia, Syria, and Egypt, among other places, its careful treatment has resulted in the evolution of an animal f remarkable value, for a Spanish e-ass is worth £200. The wild variety much hunted in Persia, and its flesh eatly prized. Because of the presence of more sugar and less cheese in milk, invalids take it with benefit. skin is manufactured into shagreen ther, and also used in the making drums. The variety called albino, white, was used by the ancients on e occasions and reserved for the ly honoured.

ssab Bay, situated on the W. t of the Red Sea. It is an Italian ng station. In 1880 it was taken by an Italian gov. from a private any and used as a coaling n. Since 1840 it has been emned with a good harbour and a ouse.

ahan, the name of an inland Sumatra, situated on a riv. of ne name. It is situated in 3° 1' and 99° E. long., and is a Portuguese settlement, whose pr cipal product is malacca.

Assai, a beverage much in favo with Brazilians. It is made by soa ing in water the fruit of the *Enter edulis*, or A. palm. The concoction said to be very nutritious.

Assai, an extensive salt lake of E Africa. It is nearly 600 ft. below se level. Caravans call there to gathe the salt that thickly encrusts its shores.

Assaki, George (1788–1869), a Moldavian poet and historian, was *b.* and *d.* at Jassy. He represented the gov. at the Viennese court, and helped in the production of the statute which reorganised the state of Moldavia. He wrote plays and poems, and a history of Russia, and is regarded as one of the fathers of modern Rumanian literature. He also managed several literary reviews, and was a member of the Roman Academy.

Assam is a chief commissionership in the extreme N.E. of India. The Brahmaputra valley in A. has in a large measure had a separate history from the remainder of India. The reason of this is the narrowness of the valley and the peculiarities of its situation. The valley is more than 400 m. long, and for most of its length less than 50 m. wide, though near its mouth it reaches a width of 100 m. Of this scant breadth the Brahmaputra, and the thick, impenetrable jungle on its banks, occupies from 6 to 20 m. The inhab., thus restricted to a small area, were exposed to incursions from hill tribes, and other invaders; this had the effect of keeping down the population. The Ahams, the inhab. who gave the name to this valley, which was afterwards extended to the whole prov., entered the dist. from the E. in about the thirteenth century. They were, however, engaged in incessant warfare with the Mohammedans in the W., who strove to annex the prov. to Bengal. The valley was conquered by the British in 1826. Since the prov. has been under British rule the prosperity and pop. alike have increased rapidly. This is largely due to the tea plantations, which were inaugurated in N. A. in 1835. These plantations, worked by coolies from the crowded dists. of W. Bengal, are strictly supervised by government. The flora of the prov. is tropical in character, the mts. and hills being covered by dense forests of evergreens. The principal forest product is rubber, and the lacquer tree of Japan is also cultivated. A good steam coal is worked in the coalfield at Makum; the other minerals include iron ore and limestone, of which there are immense beds in the S. Petroleum

is also found. The seat of administration for the province is Shillong.

Assandune, usually identified with Ashingdon, Essex, England. The scene of the defeat of Edmund Ironside by Canute in 1016.

Assary, the Roman copper coin called *As*.

Assas, Louis, Chevalier d', was *b.* at Vigan in 1733. Sprung from an old, though not aristocratic family, he entered the army while young, and reached the rank of captain in the regiment of Auvergne. The legend runs that, on the night of Oct. 15, 1760, he entered a wood to reconnoitre, and was immediately surrounded by the enemy, who warned him that if he spoke a word he would be killed immediately. Thereupon he uttered his famous cry, still quoted frequently, 'A moi, Auvergne, ce sont des ennemis!' The truth of this story had been much disputed of late years, some asserting that the incident in question never happened, others ascribing the honour of it to Sergeant Dubois. It is remarkable that biographies give but inexact and incomplete information concerning this personage, whose name occupies so striking a place in the national history of France.

Assassin, a term applied to one who murders another by surprise or by some secret means or treachery. The word is derived from *hashish*, the opiate made from the juice of hemp leaves. It was originally the name for a sect of the Shiites, known otherwise as Ismailites, founded by one Hassan Sabbah in the eleventh century. Till the thirteenth century the sect was in a flourishing state, when the Mogols under Hulaku destroyed its power. During his youth Hassan studied under a doctor at Nishapur, where he met the grand vizier of Malik-Shah. Later he endeavoured to usurp the vizier's place at the court, but failed, and was compelled to leave Persia. In 1078 he went to Egypt, where his great abilities earned him a welcome at Cairo. There, too, his efforts towards the advancement of his own interests caused his withdrawal from that country. At Kuhistan, after varied experiences, he founded the Ismailite sect. He captured by a ruse the fortress of Alamut in Persia and ruled there as chief of the society afterwards called the Assassins. The doctrines of the As. were those of the Ismailites, with the additional custom of the secret removal of all its enemies. At the head was the chief, ...el, who was assisted by three priors. Beneath these were semi-initiated members, and last the actual agents of assassination, who were called Fedians, meaning 'devoted ones.' They worked in absolute ignorance of the objects and rites of the society, and from them was exacted the most implicit obedience. The chief used occasionally to allow them every sensual indulgence, having previously drugged them with Hashish. In return for such experiences they were ready to obey his slightest wish, valuing their lives as nothing. One of the first victims was Hassan's former friend, Nizam-al-Mulk, followed shortly by the murder of the Shah Malik. Shah Malik's successor made war against the As., but to no purpose. It is said that no precautionary measures ever seemed to avail against the machinations of the society. In N. Syria fragments are still believed to exist of the society. In 1255 a massacre of 12,000 of the As. by the Tartar Khan, and a subsequent ravaging of their country by the Sultan of Egypt, Mameluke, completely destroyed their power.

The application of the word assassination is now generally limited to the taking of the life of a public personage for the motive purely of destroying his life. By the ancients it was sometimes applauded. During the sixteenth and seventeenth centuries political assassination became prominent. During the reign of Elizabeth many desperate attempts were made to assassinate her. At this time political enthusiasts resorted to the most extreme methods of gaining their ends, and assassination, the very height of violence, was frequently and successfully perpetrated by these fanatics. Among the most famous victims of assassination were Julius Cæsar, 44 B.C.; Thomas à Becket, A.D. 1170; David Rizzio, 1566; Lord Darnley, 1567; William of Orange, 1584; Wallenstein, 1634; Marat, 1793; Paul, Czar of Russia, 1801. Three presidents of the U.S.A. have been assassinated: Abraham Lincoln in 1865, James A. Garfield in 1881, and William McKinley in 1901. Ex-President Roosevelt, while campaigning for the Presidency again on the Bullmoose ticket, was shot in 1912, but escaped serious injury. An assassination plot in 1696 was organised for the contemplated murder of William III. by the Jacobites. It was their intention to kill the king on his return from a hunting expedition. One of the plotters communicated with the king, the hunt was postponed, and many arrests were made. Of unsuccessful attempts at assassination there are examples without number, and the causes which have actuated these are due chiefly to political distortion or personal ani-

mosity. Among the bodies which organise and carry out their foll work are anarchists, nihilists, and similar fanatical organisations. There is not space enough here to recount a list of *attempted* assassinations, but among the most important during recent years are those committed upon Carlos of Portugal, 1908; Alfonso XI. of Spain, 1878 and 1879; Amadeus of Spain, 1872; Bismarck, 1866 and 1874; Francis Joseph of Austria, 1853; George III. of England, 1786 and 1800; George IV., while regent, 1817; Humbert I. of Italy, 1878; Isabella II. of Spain, 1847, 1852, 1856; [illegible]—no [illegible]–46; [illegible], Napoleon III., 1855 (twice); Napoleon I., Queen Victoria, 1840, 1842 (May and July), 1849, and 1882; William I. of Germany, 1861, 1875, 1878.

Assault. Of all forms of violence that one person can offer to another an A. *per se* is the lowest form, but an A. is necessarily included in the more serious forms of violence. An A. has been defined as 'an attempt or offer with force and violence to do a corporal hurt to another.' Thus, to present a gun at a person within the distance to which it will carry, to throw a stone or other missile at him, to draw a sword and wave it, or to shake one's fist at a person within striking distance, to attempt to kiss a woman, to incite a dog to attack a person, are all forms of a common A. But no words, however insolent and provoking, unaccompanied by an act of violence, amount to an A. A term much used in connection with A. is that of *battery*, and so close is the connection that the word A. is often used in the sense of battery. A battery consists of any kind of corporal injury, however small, designedly done to another by an actual contact with his person. The injury need not be done by the immediate hand of the party; nor is it material whether the act is wilful or not, provided it proceeds from a mischievous design. Thus if a person were to throw a lighted squib into a crowded thoroughfare and on it falling near a passer-by that passer-by should, to avoid the explosion, throw it away from him and the squib should explode in the face of and cause the blinding of a third person, the first person to throw the squib would be held to have committed an A. and battery. A person assaulted is entitled to retaliate if the retaliation be not in the nature of a revenge, but undertaken merely in self-defence and with the object of ending the A. The Scotch law in particular is insistent on the discovery as to which person struck the first blow breach of the peace, and goes further than the Eng. law in ex retaliation if it does not exceed measure of resentment. In thi nection it is of interest to recal the depriving a person of a lin member needful to defence, su an eye, arm, a finger, or front t was an aggravated A. known t anct. law (but now obsolete) as hem or maiming. A person assau has two remedies; in the crim courts, or in the civil court damages, or both; but if a caus brought for damages, the defend if he has been acquitted by magistrates in the court of summ jurisdiction, may, if the A. is an o nary one, obtain a certificate from magistrate protecting him from further proceedings. The civil act to which a person who commits A. and battery is liable is an action trespass. Strictly the person assault should vindicate the public wrong prosecuting his assailant before pu suing his civil remedy, and if th accused is found guilty upon an in dictment in a criminal court, and th court is informed that an action ha already been brought in respect of th same A., a nominal sentence only wil usually be passed, unless the perso assaulted undertakes to discontinu his action. As. are divided for the purposes of criminal proceedings into common As. and aggravated As. The former is a misdemeanour, and is punishable in the police courts by a fine not exceeding £5 and costs, or, in default, two months' imprisonment, or if the case goes to the assizes as much as one year's imprisonment may be awarded. Aggravated As. have been defined by a number of statutes and include: indecent As. on women; As. on children; As. on the police and other public officials, including the clergy, in the execution of their duty; As. causing actual bodily harm or intent to do grievous bodily harm. These aggravated As. are often classed as felonies, and are punishable with long terms of penal servitude. The principals and spectators at a prize-fight are guilty of and are aiders and abettors to an A. The Scotch law with regard to A. is similar to that of England, but there is no div., as in England, into 'A.' and 'A. and battery.' There is an elaborate system of aggravations, an A. being aggravated by its intention, manner of A., extent of the injury resulting therefrom, place where it was committed, and the sort of person on whom the A. was committed. An old Scotch statute, repealed in 1826, provided that where an A. was committed

pendente lite, *i.e.* during the hearing of a cause in the courts, the aggressor should lose the case then being heard.

Assaye, a vil. of Hyderabad in S. India. It is celebrated as the scene of a battle between the combined Mahratta forces and the British under Wellesley, afterwards Duke of Wellington, in 1803. It resulted in a complete victory for the British.

Assaying, a chemical process the object of which is the determination of the amounts of certain metals in an ore or alloy. The methods used fall into two classes, 'dry' and 'wet.' In a dry assay the ore is reduced by fusion with suitable fluxes, so that the metal is recovered in a pure state. Wet methods are those in which by the action of certain reagents a solution of a salt of the metal is first obtained. The salt may be precipitated and weighed, or the strength of the solution may be determined by observation of the amount required to bring about a certain reaction with a standard solution of known strength. The composition of the salt being known by analysis, a simple calculation will determine the amount of the metal present.

The results of A. processes are dependent for their accuracy on the perfection of the balance used to estimate the different weights of the metals, which should be so constructed as to reveal the most minute differences in weight.

Before proceeding with an assay, it is necessary to obtain a true sample of the material; that is to say, a sample which is likely to contain the same proportions of its constituents ns exist in the whole bulk of the naterial. There are various devices or accomplishing this, the usual nethod being the division of a large upply of material into two unequal arts, the smaller part being subivided and so on until a sample of onvenient size is obtained. In the se of alloys in a solid state, holes are illed right through the metal in ferent places, and the drillings taken testing.

t is important to determine the ount of moisture in an ore. The plest method is to heat a sample n air-oven to a temperature of less n 100° C., when the loss of weight n the mass is quite dry indicates weight of water in the sample.

ne principle upon which the A. of and silver by 'cupellation' des is, that all metals with which precious metals are usually alare convertible into oxides by ure to atmospheric air at a high , whereas the precious metals elves remain unacted upon.

general methods of A. as applied to particular ores, etc., are seen in following examples:—

Lead.—The 'dry' assay of *gal* or lead sulphide, is carried out by m ing the ore with a flux consisting sodium carbonate and borax. mixture is heated in a clay crucible a red heat for about 20 minu and the fused material poured o The lead button generally conta impurities, such as silver, antimon and copper, so that its weight giv too high a percentage. The percen age of lead can also be gravimetric ally determined by the formatio of the sulphate. The ore is firs dissolved in nitric acid, to whic sulphuric acid is afterwards added The excess of acid is removed by evaporation, and a precipitate of lead sulphate remains. This is washed with water to remove the iron and copper salts, and the insoluble matter is treated with dilute sulphuric acid. After filtering, the solid portion is treated with hot alkaline ammonium acetate to dissolve the lead sulphate. After again filtering, the filtrate is treated with alcohol and sulphuric acid to re-precipitate the lead sulphate, which is then filtered, again washed with strong alcohol, and weighed. When, as is sometimes the case, the carbonate or white lead ore is found in considerable quantities, the process is similar, but a different flux is used.

Copper.—The percentage of metallic copper in an ore may be determined by electrolysis. The ore is treated with nitric and sulphuric acids until all the copper salts are dissolved, when the solution is freely diluted and submitted to electrolysis in a glass vessel with platinum electrodes, the copper being deposited on the negative electrode. The process is somewhat lengthy, but gives fairly accurate results. The potassium cyanide 'wet' method depends on the fact that when potassium cyanide is added to a solution of a copper salt which has been rendered blue by the addition of ammonia, the colour gradually disappears. The ore is treated with nitric and sulphuric acids and then heated until the nitric acid is evaporated. The pure copper may be obtained from the solution by placing a small piece of aluminium foil in the solution. The copper is soon precipitated and sulphuric acid is added to dissolve the aluminium. The solid portion is washed and then treated with nitric acid, which dissolves the copper. Ammonia is added to the filtrate until it is just blue. The strength may then be estimated by adding the standard solution until the blue colour vanishes.

Zinc.—Dry methods are not used,

owing to the difficulty in separating the pure zinc from the other metals found in the ores. The chief volumetric method depends on the reaction between zinc chloride and potassium ferrocyanide, zinc ferrocyanide and potassium chloride being formed. The ore is treated with a mixture of potassium nitrate and nitric acid, and a strong solution of potassium chlorate in nitric acid is afterwards added and the mass evaporated to dryness. Sodium hydrate and sodium carbonate are added and the mixture is filtered, after which the filtrate is treated with excess of hydrochloric acid. Any copper present is precipitated by passing sulphuretted hydrogen into the solution, after which the standard solution of potassium ferrocyanide is added. The end of the reaction is determined by testing a small drop of the solution with uranium nitrate. The appearance of a brown tint announces the presence of potassium ferrocyanide in excess.

Silver.—In what is called the scorification assay, the ore is mixed with an excess of lead and heated in a scorifier or clay dish. The silver compounds are decomposed, the silver forming an alloy with the lead, and part of the lead oxidising and combining with the other constituents of the ore. The metallic button produced therefore contains a small part of the lead used and all the silver. This alloy is then 'cupelled.' Cupels re small vessels moulded out of bone-sh, which has the property of absorbg molten litharge or lead oxide, hilst the metallic portion is unfected. The temperature used is st below the melting point of silver til just before the process is comte, when it is suddenly raised. The ult is that the lead is oxidised and s separated from the silver. The ys, are slowly cooled so as to d 'spitting,' of the silver button. *old*, when the alloy consists of er, is assayed by the same method used for silver, and any silver nt is removed by the action of g nitric acid, the metal being ously rolled into a thin plate, so very part of it may be reached e acid. When the alloy conf silver the process is called ng.' Generally, however, both ses have to be resorted to. mation with mercury is also d to when gold has to be ed from sand, gravel, etc. —Dry methods are almost , and wet methods are all n the readiness with which alts can be oxidised to ferric ferric compounds reduced to ous condition. The most general method is the addition o potassium bichromate to an aci solution containing iron in a ferrou state. The ferrous salt is oxidised an the colour changes to green owing t the formation of a chromium salt. The solution must be continually tested by adding a drop to a little freshly-prepared solution of potassium ferrocyanide on a white tile. When no blue colour is produced, the ferrous salt has been completely oxidised. The amount of the standard solution of potassium bichromate used determines the strength of the solution of the ferrous salt.

Assche, or **Asche**, a small tn. in Brabant, Belgium. It is situated 9 m. N.W. of Brussels.

Assegai, a weapon for throwing, usually a light spear made of wood and tipped with iron. It is used particularly by Zulu tribes of S. Africa. There are the long and short assegai.

Assemani, Giuseppe Simone (1687–1768), a member of a Syrian family of celebrated orientalists. When young he attended the Maronite College in Rome, whence he was transferred to the Vatican Library, and afterwards made archbishop *in partibus* of Tyre. The pope sent him on an expedition to Egypt and Syria in quest of valuable MSS. His successful discovery of 150 of great value resulted in a second and even more successful journey. He ed. and pub. the most valuable MSS. of the Vatican. His two great works are the *Bibliotheca Orientalis Clementino-Vaticana rec. manuscr. coad. Syr., Arab., Pers., Turc., Hebr., Samarit., Armen., Æthiop., Græc., Ægypt., Iber., et Malab., jussu et munif. Clem. XI.*, and *Ephraemi Syri opera omnia quæ extant Gr., Syr., et Lat.*

Assemani, Simone, was the grand-nephew of Giuseppe Simone A., and lived in the eighteenth century. He was *b.* in Syria, but came to Italy, and was professor of oriental languages in the university of Padua. He was the author of several works in Ital. and in Lat. on Arabian literature and history. Vella, a native of Malta, pretended to have found, in an Arabic MS. in the convent of S. Martino at Palermo, a diplomatic code of the Sicilian Saracens, trans. it and pub. it in 1789. A. pronounced the text to be unintelligible, as did also Joseph Hager; and Vella was imprisoned for his imposture.

Assemani, Stefano Evodio, was the nephew of Giuseppe A., whom he succeeded as librarian of the Vatican. He was also bishop of Apamea, and amongst his works the two most important are: *Bibliothecæ Mediceo-Laurentianæ et Palatinæ Codicum MSS. Orientalium Catalogus*, with

notes by Gorl, 1742; and *Acta Sanctorum Martyrum Orientalium et Occidentalium*, 1748.

Assembly, General, of Scotland, see GENERAL ASSEMBLY.

Assembly, National, see NATIONAL ASSEMBLY.

Assembly of Divines, see WESTMINSTER ASSEMBLY OF DIVINES.

Assen, the cap. of the prov. of Drenthe, Holland. Peat-cutting is the chief industry. Pop. 11,329.

Assent, Royal. When a bill has passed through both houses of parliament in the same session it does not become an act, or the law of the land, until the sovereign has signified his or her consent, such consent being known as the R. A. The Parliament Act, 1911, provides that where a bill has passed the Commons twice in three successive sessions, such a bill may be presented direct to the king for his assent even if the Lords refuse to agree to its passage. The R. A. is sometimes given by the sovereign in person, but more often by lords commissioners representing him, the power to do this being conferred by 33 Henry VIII. c. 21. The commissioners usually three or four of the great officers of the state, and they hold letters patent under the great seal, signed by the king's hand. They or the sovereign signify the R. A. in the House of Lords, but the Commons also present at the bar, to which are summoned by the black rod, to which they repair headed by speaker, the ministers, and the members of the House. The assent is in Norman-French in the following picturesque fashion. After the title of the bill is read by the clerk of the crown, the clerk of the parliament 'Le Roy (or, La Reyne) le veult.' expression of thanks for the 'benevolence,' of 'ses bons sujets' is added to the assent to a money bill, there is yet another formula for assenting to a private bill. Should the refuse his assent to a bill, the announcement is, 'Le Roy avisera'—*the king will consider it.* the sovereign can now only act on the advice of his ministers, *i.e.* the this contingency never arises. instance in which the R. A. refused was by Queen Anne in when she refused her assent to militia bill, but in former refusal of the R. A. was a enough occurrence. Queen once at the end of a session assent to forty-eight bills total of ninety-one presented In 1858, says Professor Queen Victoria was nearly ministers to veto a private ed by the 'Pimlico Committee' because the House of Lords had not permitted the Board of Trade to appear and oppose something which it ought to have opposed before the Private Bill Committee. Unless it is stated to the contrary in the body of a bill, a bill becomes the law of the land, and its operation commences from the day it has received the R.A. A bill to abolish the employment of French in the R. A. passed through the Lords and was read a second time in the Commons, but it got no further, so that this tongue is still employed for this purpose, although it was enacted in 1731 that all proceedings in courts of justice should be in Eng.

Asser, properly **Ashi** (353–426), a Jewish doctor *b.* in Babylon. He was president of the Academy of Sora, or Euphrates. He collected all the Jewish laws, doctrine, and tradition into the *Talmud of Babylon*, which is ranked above that of Jerusalem by the Greeks.

Asser, or **Asserius Menevensis,** a learned monk of St. David's, and *b.* in Pembrokeshire. King Alfred made him his preceptor and companion, and promoted him to bishop of Sherborne. He *d.* in 910. In 1572 his life of Alfred, *De rebus gestis Ælfredi Magni*, was published by Archbishop Parker.

Assessment is the fixing by the discretion of the authorised assessor of the value of a property or income for the purpose of taxation or judicial award. *See* articles on TAXATION, COSTS, and DAMAGES.

Assessor. The word is derived from the Lat. *adsessor*, one who sits beside another, and signified one who was learned in the law and sat by a magistrate or other functionary, such as a governor of a prov., to aid him in the discharge of the judicial duties of his office. In modern times the word has been applied in the reverse sense to one who, having a special technical knowledge, assists a judge to arrive at a decision, though having, of course, no part in the judgment. The Judicature Act, 1873, provided for their employment in all High Court cases, and the Appellate Jurisdiction Act, 1876, empowered the Judicial Committee of the Privy Council to obtain the help of the archbishops and bishops in eccles. causes. In maritime causes particularly As. are frequently employed, such As. generally being Trinity Brethren. The power to employ As. in hearing appeals from the Admiralty Court was conferred on the House of Lords by the Supreme Court of Judicature Act, 1891, and under the Patents Act, 1883, either party in an action for infringement of patent is entitled to demand that the case be heard with an A. The Clergy Discipline Acts require that the

bishop inquiring into the case should be assisted by three As., one of whom must be a barrister and another being generally his chancellor. Apart from ecclesiastical and maritime causes, the help of judicial As. is not often resorted to, their functions having long since been performed by expert witnesses. The Municipal Corporation Act required the annual election by the burgesses in all municipal boroughs of two As. whose duty it is in conjunction with the mayor to revise the burgess lists.

Assets, in ordinary commercial parlance, implies any property or stock-in-trade of a merchant or company, and the term in this sense is used generally in relation to bankruptcy and insolvency. The more strict and legal application of the term (which is derived from the Norman-French *assetz*, meaning 'enough') is to the real and personal property of a deceased person, which, either in the hands of his heir, devisee, executor, or administrator, is chargeable with the payment of his debts and legacies. Strictly speaking, therefore, the term does not apply to an intestate person's estate or to the estate of a person who dies with no debts to be paid. A. are either *personal* or *real*. The former comprehend goods, chattels, and debts, whilst the latter include real estate (*i.e.* landed property), whether it descends or is devised to the heir-at-law. Both classes, by the operation of the Land Transfer Act, 1897, now devolve on the executor or administrator in the first place. A. are also divided into *legal* and *equitable* A., a distinction derived from the nature of the claim of the creditors on the heir or administrators of the estate. 'Specialty' creditors, *i.e.* those whose debts arose from a sealed instrument or bond, were formerly entitled to payment before those whose debts were n the nature of a simple contract, but is privilege has been abolished, and oth classes of creditors are now paid *ri passu*. The first charge upon a ceased's estate is the expenses of e funeral and the expenses involved dministering the estate. The next arges, if they are legal A., are those ch have statutory priority, such npaid taxes, rates, judgments of courts, etc. Next come ordinary itors, and finally voluntary obli-ons. In equitable A., however, executor must pay whomsoever obtains a judgment for his debt: nnot plead that he must keep any part of the A. to meet other ors' demands. When all the A. been expended to meet the de-s of various creditors and there ll creditors after the estate is ted, the administrator is entitled to protect himself by the pl *plene administravit*, *i.e.* that he fully administered the estate. W this plea is put forward the credit awarded a judgment of As. *in fut* meaning that he shall be paid out any A. that may accrue to the fendant. In Scotland, although t word is used in the general sense property, there is no legal term For administration of a bankrupt A., *see* BANKRUPT.

Assheton, William (1641–1711), divine, was *b.* in Lancashire. He wa a voluminous writer, and possessed foresight. His works include *Toleration Disproved*, *Danger of Hypocrisie*, *The Certainty and Eternity of Hell Torments*. His scheme of insurance for the clergy may be said to be the forerunner of present-day methods.

Assi, Adolphe Alphonse (1840–86), a Fr. communist. He was transported in 1872 to New Caledonia.

Assideans were zealous defenders of the unity of the Deity and the belief of their ancestors, who opposed Antiochus Epiphanes (175–164 B.C.) and his successors when they endeavoured to put aside the Jewish religion and to introduce idolatry. The leader of these A. or Chasidim was Mattathias, who killed the commander of the tyrants at the idolatrous altar in Modeim, near Joppa. Antiochus, after an unsuccessful attempt to plunder a temple in Elymais, *d.* in a state of raving madness. The name Chasidim was given by later Jews to those persons who devoted their lives entirely to religious exercises and bodily chastisements, to expiate their own sins, or those of others, or to hasten the coming of the Messiah. They studied the kabalah, fasted, and by mortifying the flesh thought to free the spirit from the body, and so to enter into communion with God and angels. About the middle of the eighteenth century a new sect of Chasidim arose, who held the belief that communion of man with God was effected by contemplation and prayer. This sect increased in number, some were considered representatives of God and their works were regarded as oracles.

Assiento, from the Spanish, meaning 'contract.' It is specially used in naming a contract between Spain and another power when the Spanish gov. conferred upon the unknown party a slave monopoly for its colonies in America. A treaty of a like nature was entered into by Charles V. with the Flemings, which compact was the first of its kind. Similar agreements were concluded with the Genoese, Fr. Guinea Company, and England. Out of the disagreement over the A. between Eng-

land and Spain concerning certain privileges granted to the South Sea Company arose the war of 1739. In 1748 four years still were due to lapse, but at a cost of £100,000 the British abandoned the A.

Assignat. One of the earliest measures of the Constituent Assembly during the French Revolution was to appropriate to national purposes the landed property of the clergy. The next step was to raise money on this confiscated land. To sell or lease the land in that troublous period, when neither life nor property was secure, would have been to sell it at a much depreciated price. Ready money, however, had to be obtained, so the device was hit upon of issuing bonds on the security of the land. These bonds were called As., as they represented land assigned to the holder of these bonds. The first issue of these bonds amounted to 400 million francs (£16,000,000), and were generally in notes of 100 francs (£4) ach, though many of them were for ower sums. Like Eng. exchequer-ills, they bore interest by the day, nd all notes which came back to the ov. in payment for national lands ere to be cancelled. The object issuing As. was not only to ob-in the full value of the confiscated nds, but also to supply the deficiency coin in circulation, such deficiency sing from the general feeling of in-urity. Shortly after the first issue ther 800 millions in addition were ed, but without the liability to pay rest. The last of these two issues made in September 1790. These es undoubtedly did much to re-the gov., and it has been claimed the As. saved the Revolu-but the injudicious recourse to ystem of money-raising brought ountry to the verge of bank-y. In the beginning of 1791, the ative Assembly sequestered for enefit of the state the property the wealthy *émigrés*, and in due the crown estates. On these As. were issued, and by Sept. ie total amount issued was by issue of 200 millions brought 700 millions. Towards the end year, the double effects of the insecurity of property and and of the depreciation of As. by their over-issue, caused a ise in prices, with its natural tant, distress and pillage of In June 1793 one franc in as worth three francs in n August it was worth six. teract this decline and to distress the most extreme were taken by Convention, fixing a maximum price to l other necessaries of life were enacted. In Aug. 1793 there were in circulation 3776 millions of As.; but by a forced loan of 1000 millions, and by the collection of a year's taxes, this amount was reduced to less than two-thirds. The confidence, moreover, inspired by the recent successes of the republic against its foreign and domestic enemies tended to increase the value of the securities on which this paper money ultimately reposed; and towards the end of 1793 the As. are stated to have been at par. This recovery, whether real or apparent, was of very short duration. The wants of the government led to a fresh issue of As. Eventually the enormous sum of 45,500 million francs in face value was in circulation, and the value of As. sank almost to *nil*, and early in 1796 a louis d'or (24 francs) was considered worth 7200 francs in As. Under the Directory recourse was had to a new kind of paper-money, the *mandat*. These mandats were to enable any person who was willing to pay the estimated value of any of the national lands to enter into possession. They furnished, therefore, a somewhat better security than the As., as these could only be offered in payment at sales by auction. The estimate of the value of the lands was that of 1790, and in many cases this had considerably depreciated by 1795. The mandat of 100 francs at its first issue was worth only 16 francs in silver, and soon fell to a seventieth of their nominal value. The gov. were soon forced to abandon the mandats and declare that they should be received only in payment of taxes and of land. The last issue of paper-money was in 1797, and since then to the outbreak of the Great War the legal currency of France was purely metallic.

Assignation, *see* Assignment.

Assignee in Bankruptcy, a person officially appointed on behalf of the creditors to manage a bankrupt's estate and now termed a *trustee*. *See* Bankruptcy.

Assignees, *see* Assigns.

Assignment, in English law, is the name given to a deed or an instrument of transfer, the operative words of which are to 'assign, transfer, and set over,' and which transfers both real and personal property. In Scots law the word *assignation* is used in conveyancing, and corresponds to the English law term A., but in some instances, where statutes employing the phraseology of the English law have been extended to Scotland, the word A. has necessarily obtained a partially technical use. Thus property in copyright, patents, registered vessels, all of which are transferable, are in

Scots law also referred to as being assignable. The prin. interests in land to be assigned are estates for life or for any definite period of uncertain duration, and a statute of Charles II. (statute of Frauds and Perjurie [illegible] A. to be in writing. [illegible] a lease in being a [illegible] interests of the lessor; whereas a lease is an estate for years taken out of a greater estate, creates the relation of landlord and tenant, and reserves to the lessor a reversion. In all underleases, therefore, it is necessary that part of the original term should remain in the lessor, a day being sufficient. With regard to personal property, A. of goods and chattels in possession is made by Bill of Sale (*q.v.*). According to the Eng. common law [illegible] assignable. [illegible] chose in [illegible] a debt, a legacy, damages, etc., and the idea underlying the prohibition to assign these choses in action was to disc[illegible] The rigour of suc[illegible]s mitigat[illegible] which, on [illegible]ctioned the transfer of such property, and even in the courts of common law the ancient principle was often evaded. Since the Judicature Act, 1873, every legal chose in action is assignable provided that the debtor be served with a notice of such A. In general it may be said that any form of property is now assignable with perfect freedom, if we except a few cases which are considered contrary to public policy, such as the A. of pensions and the salaries of civil servants. Mortgages can be, and frequently are, assigned, and Bills of Exchange (*q.v.*) are assignable on indorsement.

It follows from the definition of assignation as the conveying of the right to a thing and not the thing itself, that in Scots law, in the case of movable property, A. can only take place when that property is in the hands of a third party. To make the transaction complete, formal notice must be given the third party, and until such an intimation has been made the cedent's creditors may attack the property in the hands of the holder. This intimation is an important part of the transfer, for though as between the parties mere knowledge of the transaction is sufficient, in the case of a competition for preference in payment the assignation first intimated will have preference over others which may be prior in date, but of which intimation of assignation has been received later. Such intimation is, in its most formal shape, made by the reading of the document to the debtor in the presence of a notary-public and witnesses, but under the Transmission of Movables Act, 1862, and the General Clauses Act, other forms of formal notice are admitted. A. of property is void if it be with intent to defeat or delay creditors, unless the transfer is made for valuable consideration and the assignee has no reasonable grounds for suspecting fraud.

Assigns in Eng. law and Assignees in Scots law is the name given to the parties in whose favour a deed of assignment or assignation is made or property assigned.

Assimilation, the process by which nourishment is absorbed and converted into part of the bodies of living organisms.

Assing, Ludmilla (1827–80), daughter of Lady A., was *b.* at Hamburg. On the death of her parents she went to live with her uncle Varnhagen at Berlin. She was sentenced to imprisonment in 1863 and in 1864 for having published posthumous works of her uncle which compromised some of the most eminent persons of the day, but she had previously retired to Florence in 1861. She married, in 1874, an It. officer, Cuio Grimelli, but soon separated from her husband. Her reason failed in 1880, and she died in the same year at Florence.

Assing, Rose Marie Varnhagen von Euse, Lady (1783–1840), was *b.* at Düsseldorf. A poetess herself, she married Dr. D'A. A., a poet, in 1816, and gathered round her at Hamburg the most literary people in Germany.

Assiniboia, a name previously applied to two dists. of Canada, but now not held by either. The derivation of the word is from the Ojibway *assini*, meaning stone, and the latter end meaning to cook. The first dist. was formed in 1835 by the Hudson [illegible] exist [illegible]ert's [illegible]egion was created by an Act of Parliament in 1875. By the Dominion Act of 1905 it was united to the former, and now forms part of the prov. of Saskatchewan.

Assiniboine, a riv. of British N. America. It rises in 51° 40′ N. lat., and 105° E. long. It joins the Red R. at Winnipeg. Its course measures about 400 m., and its tribs. are the Little Souris, Qu'appelle, Rapid R., White Sand R., and Beaver Creek. A tribe of Indians takes its name from the riv. Steam communication exists between Winnipeg and Fort Ellice, about 700 m. distant.

Assinie is a seaport at the mouth of the A. riv. in W. Guinea. A Fr.

colony. It is the second tn. of the Ivory coast, numbering about 4000 inhabitants.

Assisi, a tn. of Umbria, Italy, in the prov. of Perugia. The tn. commands a splendid view of the valleys of the Tiber and the Topino, as it is situated on a mt. 1345 ft. above sea-level. The tn. owes a great deal of its fame to the bp. of St. Francis, who was *b.* 1182 and *d.* 1226. Directly after his canonisation the Franciscan monastery was begun, and completed in 1253. The building is a magnificent example of Gothic architecture. In 1818 the sarcophagus containing his remains was discovered, and a crypt was consequently added. In the lower church are decorations by Cimabue and Giotto. A feature of



ASSISI
(View from the east)

the tn. is the castle of mediæval style built by Cardinal Albornoz in 1367. It is 1655 ft. high, and was added to by Popes Pius II. and Paul III. To the S.W. of the tn. is a large church where St. Francis is said to have died, and which contains the original oratory. The tn. is famous as a pilgrimage resort and for its influence in the history of It. art. Metastasio, a poet, was born there in 1698. Pop. ...492.

Assiut, or **Siut**, cap. tn. of prov. of same name, Upper Egypt, near W. bank of R. Nile, 248 m. S. of Cairo. It is the residence of the governor, and is the largest tn. and the most important commercial centre in Upper Egypt. The handicrafts for which it was formerly noted (pottery, inlaid wood, ivory carvings, leather and woven goods, and tulle shawls) are being rapidly ousted by European factory-made goods. There is an Egyptian Museum belonging to a wealthy resident. The Mohammed Ali Asyut Institute, founded in 1915, has 64 professors and 931 students. Near by are the Rock Tombs of Ancient Asyut. It is the chief seat of the American Presbyterian Mission, which has in Egypt 342 stations. One of the Nile dams has been constructed here. Pop. (1927) 57,036.

Assize. This word, like so many other legal terms, came into the Eng. language from the Lat. *via* the Norman-Fr. It is derived from the Fr. *assis*, but comes ultimately from the Lat. *assideo*, to sit by. It is possible that the word A., where it signifies an ordinance, a decree, or an assessment, and which is derived from another Lat. word, *assido*, meaning to assess, fix, or ordain, may in anct. times have been confused with the former word. In the latter sense the word was used for sev. ordinances, chief among which are those known as A. of Bread and Ale, the A. of Clarendon, 1166, and the A. of Northampton, 1176. By the first the price of bread, ale, fuel, and other necessaries of life was fixed. The A. of Clarendon was an important ordinance of Henry II. reforming the administration of justice. It contained the beginning of the system of trial by jury and the A. of Northampton still further removed administrative machinery from the control of the barons. The As. of Jerusalem were a code of feudal laws formed in 1099 for the new Christian kingdom of Jerusalem founded by the Crusaders.

The most common connotation of the term A., and that in which it is almost exclusively used at the present day, is that which denoted the session of High Court judges held periodically in each of the cos. of England and Wales. Their origin is to be found in articles 22 and 23 of Magna Carta, which provided that judges should visit each co. to take As. of *novel disseisin* and *mort d'ancestor* (abolished in 1835), *i.e.* to settle disputes about the possession of land. Prior to this, by the common law, the administration of justice was confined to the judges sitting in term at Westminster and to justices in eyre (*i.e.* itinerant judges), whose circuits sometimes took seven years to complete. The statute of Westminster II., passed in the thirteenth year of Edward I., enacted that the justices should be two sworn judges, and that they should hold court in each shire not more

than thrice a year. Since the passing of 1 William IV., c. 70, these courts have been held generally twice, but sometimes thrice, a year on a regular system, the country being divided for this purpose into *circuits* (*q.v.*). London and Middlesex do not come within the circuit system, the administration of criminal justice being at the Central Criminal Court (*q.v.*). Judges in the A. courts are as fully qualified to deal with all questions of law and fact as are those of the High Court, and in practice are always judges of that court. Their powers are now derived from four authorities: firstly, a commission of the *peace*; secondly, a commission of *oyer and terminer* (*q.v.*); thirdly, a commission of *gaol delivery* (*q.v.*); and, fourthly, a commission of *nisi prius* (*q.v.*). The Scottish courts of justiciary are circuit courts somewhat similar in their function to the A. courts of England, but in civil causes they are practically limited to hearing appeals from the small debt courts. Only occasionally is a civil trial by jury transferred from the Court of Session to the Court of Justiciary. There are three circuits, N., S., and W. (the Court of Session being at Edinburgh in the E. of Scotland), in which courts are held twice a year, but owing to pressure of work, Glasgow, Perth, Dundee, and Aberdeen have additional courts.

Assmannshausen, a vil. in the dist. of Wiesbaden, on the Rhine, 2 m. from Rüdesheim. It is celebrated for its wine. Pop. 1430.

Associate Synod, Associate Presbytery, names at one time adopted by distinct seceders from the Church of Scotland.

Associated Counties. In 1642 Essex, Cambridge, Norfolk, Suffolk, Hertford, and later Lincoln and Huntingdon, formed a league to defend their territories from destruction during the civil war. Their troops were commanded by Lord Grey of Wark and later by Cromwell.

Associated Press. This is an American body, which claims to be the largest co-operative news organisation in the world, and in support of this claim points to the fact that it represents 1200 daily and Sunday newspapers, and that its annual revenue is in the neighbourhood of ...,000 dols. It works with twenty... agencies abroad and provides ...embers with 'spot' news, ob...ely presented.

...ociates, the term applied to ... of the crown office, who ... once 'associated' with the ... of the commission of assize. ...re officials of the King's Bench ... the High Court, and must be barristers or solicitors. Their duti[es] include keeping the records of th[e] court; the preparation of the cau[se] lists, attendance on the judge i[n] court, and the entering up and de[-] livering to the right quarter th[e] verdict and record of the case.

Association, The, a league, the ful[l] name of which was 'The National Association for King William,' formed in 1696 to protect the king against popish plots, as a result of the recent assassination plot. It enjoyed considerable popularity.

Association Football, *see* FOOTBALL.

Association of Ideas, an important term in philosophy and psychology first used by the English philosopher Locke, but given by him a very limited reference, and used rather to connote mental idiosyncrasy than as a term explanatory of the operations of thought generally. The office which A. performs is to connect and arrange ideas, to regulate the succession of the thoughts. When one thought is suggested by another, or when a train of past images is summoned by something present, whether spontaneously or by an exertion of the memory, the process by which this is made is called A. Thus by an A. of I. 'lightning,' either actual or the mere word, suggests 'thunder,' and 'black' suggests 'white,' 'funeral,' or 'negro.' David Hume, the Scotch philosopher, was the first modern writer who traced the influences of our As. to certain principles, which he denominated 'resemblance, contiguity in time or place, and cause or effect,' but Aristotle in his treatise on memory had enumerated three principles of A., viz. similarity, coadjacency, and contrariety. This latter category, contrariety or contrast, is now generally abandoned, for on reflection it will be seen that all associated contraries can just as well be classed under contiguities. In the same way causation is merely another case of contiguity, and most modern writers assign A. of I. to two great principles: *likeness* and *proximity* (or, more technically, similarity and contiguity). Two examples of A. arising from contiguity have been given above. In the first case the A. arises purely from contiguity (of time), for our brain has recorded the fact that immediately after most flashes of lightning there has been thunder. As for the second example, it is obvious that although 'white' is the contrary of 'black,' it is also contiguous (in time and place) to it, for we cannot think of 'white' (a relative term) without at the same time thinking of the 'non-white' surroundings, *i.e.* black. The law of similarity may be defined as *present*

impressions which tend to revive a memory of *previous* like impressions. Thus we may find ourselves seated in a theatre next a lady whom we have never before seen, but who, by similarity of features, or pose of the head, calls to mind the marble bust of Clytie. It is plain contiguity cannot here be the cause of A., for we have not seen the lady before; the A. rests, therefore, entirely on the common measure of resemblance, or similarity. If the mind were only capable of working on the principle of contiguity we should recall nothing but that in which some connection was already formed. There may be large classes of our As. which are not referable to any of the above principles, *e.g.* the terms of art and the words by which we designate moral and intellectual qualities and operations; in short, the whole vocabulary of language, in which there is next to no connection, either in the way of resemblance, contiguity, cause, effect, or contrast, with the ideas or objects represented, although none of them ever fails to summon up the images of the things for which they stand. But, according to Spencer, anomalies like this, when reducible to certain limits, establish rather than invalidate the laws to which they form an exception. Once the principles governing A. of I. are grasped, the importance is realised of disciplined use of the associating faculty. Sometimes trains of As. involuntarily convey the thoughts to subjects foreign to our wishes. They run away, as it were, with our ideas, and awaken images and recollections which not only startle us by their abruptness, but occasion us at times no little trouble to account for their presence. Yet the explanation of this phenomenon is not difficult. While thought is intensely directed to a particular subject, the As. act in subordination to that which is for the time 'the ruling idea of the mind'; when this mental intensity subsides, the attention ceases to concentrate the faculties of thought and the mind relapses into its ordinary mood in the absence of excitement. Hence the attention which fixes the thoughts controls the As.; the relaxation of attention which allows the thoughts to wander grants the same liberty to the As. The associationist school is the name given to those psychologists who endeavour to explain all mental processes by the theories of A. of I. The school is almost entirely Eng., but it includes the Fr. thinker Condillac. Hobbes, Hartley, and Hume may be said to be the founders of the school, and notable representatives of it in more recent times are the two Mills, Herbert Spencer, and Professor Bain. Diversity of opinion exists among the associationists, some, like Hartley, emphasising the predominance of contiguity, while others, who number among them Herbert Spencer, insist on the importance of similarity. This latter section is still further divided by those who would make of contrast a distinct principle. In recent years psycho-analysis has made great use of the principle of A. of I. in securing that catharsis which is the basis of mental therapy. From the psycho-analysts the police have adopted this idea as an aid to the discovery of crime by the interrogation of suspects; cf. the 'third degree' as applied in the U.S.A. *See* articles on the respective writers above mentioned, and on PSYCHOLOGY.

Assoilzie (O. Fr. *assoiler*, and Lat. *absolvere*, to absolve), a term in Scots law meaning to absolve from a claim, to acquit, to pronounce not guilty.

Assolant, Alfred, a Fr. novelist and journalist, was *b.* at Aubusson in 1827, and *d.* in 1886.

Assonance (Lat. *assonare*, to sound or to respond), a form of rhyme not strictly correct. In the final words it is sufficient to have similar sounding vowels irrespective of the consonants connected with them. It is a form that is popular in much of our rustic verse. In foreign literatures A. is studied and cultivated to an artistic degree. It appears to have played an important part in the evolution of rhyme. It has generally disappeared as the ear gained in discriminative appreciation. A preference for assonant rhyming is found among the romance languages, while in the Teutonic the reverse is the case. One reason, of course, is that the harsher and more discordant consonants of the Teutonic tongues have a more distorting effect upon their vowels. In Spanish literature A. is cultivated and recognised as the most popular form of rhyme at the present day. Its use in prose serves to ornament it and to point to skill in the stylist, but often the occurrence is due to coincidence. From the point of view of art it is regarded as of poor artistic quality, and by the most eminent authorities its use is not admitted to be justified in Eng. literature. It is a form that the purist would rigorously ignore.

Assos, a tn. on the Gulf of Edremid, Mysia. It is in ruins, and many expeditions organised for the purpose of excavation have unearthed a bath, a theatre, a senate house, and seven Christian churches. Its site is now occupied by the Turkish vil. Behràm.

Assouan or **Assuan** a tn. of Upper Egypt, on the Nile. It is the cap. of the most southerly prov. of Egypt, bearing the same name. It is popular as a health resort and tourist centre. Some remains of the anct. city still exist in the form of granite columns and portions of the ruins of a temple. The once considerable trade in the products of the Sudan and Abyssinia has almost entirely ceased since the construction of the railway to Port Sudan. The granite quarries from which the ancient Egyptian builders and sculptors drew their supplies are situated in the hills to the S. An unfinished Obelisk 137 ft. long and 14 ft. thick is there. Blocks were detached by boring holes, driving wedges into them, and then wetting the wedges. On the island of Elephantine is the Nilometer, and the Aswan Museum, containing objects found in Lower Nubia. The Rock Tombs of Elephantine of the princes and grandees and the ruined Coptic Monastery of St. Simeon are also in the neighbourhood. For a time it was strongly fortified by Egyptian and British troops, but since a defeat of the Kalipha the fixing of the Egyptian frontier farther S. lessened its military advantages. At A. is situate one of the greatest dams on the Nile. Pop. 16,128.



THE DAM AT ASSUAN

Ass's Foot, another name for colt's-foot.

Assumpsit (past tense of Lat. *assumo*, barbarously signifying 'I undertake'), an old form of action under the common law so called because the defendant was said to have taken upon himself (*super se A.*) to pay the plaintiff so much money. It was used to recover damages for breach of a simple contract, *i.e.* a contract not made under seal, but in form the action was similar to an action for trespass. The action could not be sustained unless the promise to pay had been expressly made, either by an actual written instrument, such as a promissory note, or implied, as when a householder receives goods delivered by a tradesman, or an inn-keeper undertakes, by his action of receiving a traveller, the responsibility for the security of the goods of his guest. Like so many other common law forms of action, the action for A. has been superseded by such statutes as the Common Law Procedure and the Judicature Acts.

Assumption, Feast of, a festival of the Christian Church celebrated on Aug. 15 to commemorate the ascent into heaven of the mother of Christ. Its authority is taken from Apocryphal sources. The festival was first instituted by the Emperor Maurice in A.D. 582.

Assur, a Heb. name for the dominion of Assyria. It is mentioned in the Old Testament.

Assurance. This term is often applied specially to life as distinct from fire and other clauses of insurance, but A. and insurance are practically identical. The term is also frequently applied to grants or conveyances of interests in land. *See* INSURANCE.

Assur-bani-pal, King of Assyria. He succeeded Esar-haddon in 669 B.C. The chief events of his reign were the suppression of an insurrection in Egypt, the defeat of Te-umman, King of the Elamites, and the conquest of Babylonia, of which the king, Saosduchinos, brother of A., had revolted against the Assyrian overlordship. In spite of these successes, the reign saw the beginning of the decline of Assyrian power.

Assynt, Loch, a fresh-water lake of S.W. Sutherland. It is 215 ft. above sea-level. Its length is 6 m., and its breadth ¾ m.

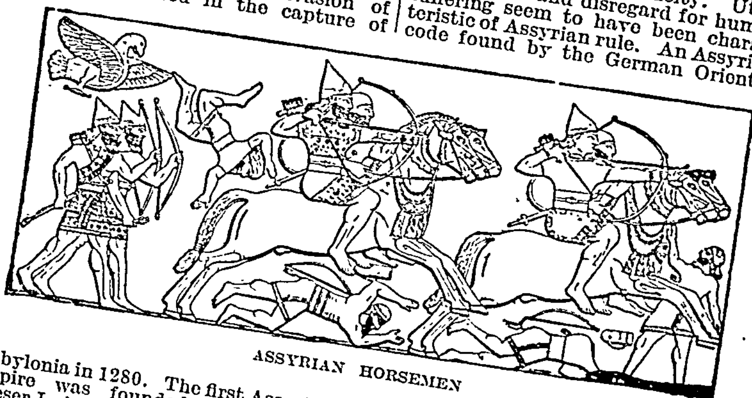
Assyria: in Assyrian inscriptions

Assur; in the Persian, Athura; in the Median, Assura. It was the northernmost country that occupied the great Mesopotamian plain. Its boundaries were, on the N. the Niphates Mts. of Armenia, on the S. Susiana and Babylonia, on the E. Media, and on the W. the Tigris or, more accurately, the watershed of the Euphrates. Its length was about 280 m. from N. to S. and its breadth 150 from E. to W. It is interrupted by mt. masses on the N. and E., and drained by the Tigris and its affluents. The most fertile part of the country, Adiabene, lay between the Zab rivs. The anct. cap., Ninus, founded by the king of the same name, was, according to Strabo, situated on the Tigris and in the Aturian plains. Conjecture identifies its ruins with those on the Tigris opposite Mosul. Its political importance was due to its position between the Semitic tribes and Iran. It attained a high standard of civilisation, proof of which exists in the testament of old writers and in the existence of the ruins of huge cities, of irrigation contrivances and canal routes. Modern excavations have yielded, too, many relics of great value in art, and show the lofty intelligence possessed by the Assyrian peoples. Nineveh is the centre around which many of the ruins are grouped, while farther S. a continuous ine of ruins extends along the Tigris rom Tekrit to Bagdad. The magnicent country was reduced to its resent barrenness under the Mohamedans. Among anct. authorities ere is much divergence of opinion specting the actual history of the syrian empire. Ignoring the less ustworthy authorities, we find in the ble (Genesis x. 11) information that neveh was founded from Babyia. In fact both Babylonia and A. so many characteristics in com n and were moreover so closely nected one with the other, that to of the rise of one is but to learn e fall of the other. Recent excaons have borne out the fact of veh's situation in Babylonia. inscriptions on bricks from the ap., Assur, has been gained the uation that the original rulers of nd were called Patesi, and the tself bore the name Pal-bi-ki. rther information is available year 738 B.C., when their king, r Tiglath-pileser II., invaded ne and was paid money to te by Menahem, King of Israel. the same reign, Ahaz (Jehoecame a vassal of the court of le those tribes beyond the were carried off as captives in Sargon, 'the Tartar,' who osed his master Shalmaneser, captured Samaria in 722 B.C. Isaiah mention is made of the si and capture of Jerusalem by Sarg and also the siege of Ashdod (712–7 B.C.). The latter event has no co nection with the siege in 701 Sennacherib. The next record that of Esar-haddon, son of Senna cherib. Esar may be given first plac in the rank of the most powerful o the Assyrian rulers. He extende his dominions to the Mediterranea and acquired Egypt by conquest. In the book of Judith, the record of Holofernes' expedition is too much involved in obscurity to warrant much reliance being placed upon its authenticity.

From this time the empire seems to decay, and its decline had assumed such a stage that a union of Nabopolassar of Babylon and Cyaxares of Media was formed for the destruction of the country. The resulting war was protracted by an invasion of the Scythians, who prevented by counterattraction any harm from Cyaxares. Eventually, however, Nineveh was captured and destroyed about the year 605 B.C. In alliance with Media, an Assyrian rebellion met with signal failure in the time of Darius Hystaspes. The cap. had quite ceased to be during the reign of Herodotus. The actual ruins of the city were noticed by Xenophon, who testifies to the height of the ruined walls (150 ft.). A minor tn. seems to have flourished during the reign of Claudius on the old site. In Tacitus the last mention is made of the tn. A history of the city by Ctesias, largely the product of an imagination soaring above the facts at his disposal, is based upon partial Gk. and Persian myth. At the time his work was received with some credit, but recent investigations have proved the error of his statements. In 600 B.C. A. became a Median prov. and subsequently, together with Babylonia, it formed one of the principalities of the Persian empire. In 331 B.C. Alexander defeated Darius Codomannus at Gaugamela in A. Twenty years later A. became part of the kingdom of the Seleucidæ, whose cap. Seleucia was situated on the R. Tigris. Under the Parthian kings the cap. was transferred to Ctesiphon, and was at times in possession of the Roms. The successors of Mohammed destroyed the Persian kingdom of the Sassanides, and A. now came under the rule of the caliphs. Their cap. was Bagdad during the years A.D. 762–1258. From 1638 it has been governed by Turks, after being captured by them from the Persians.

Before the Assyrian monarchy began its fascinating history, that of Babylonia had already approached its

end. In early times the governors of Assur were those appointed by Babylonian monarchs. In the seventeenth or sixteenth century B.C. they had acquired sufficient power to establish their independence at Assur. Guerilla warfare on the border was for some considerable time maintained, with an occasional peace, produced by alliances of marriage. Of the actual kings of A., apart from the governor appointed by Babylonian rulers, Bet Kapkapi was the first. The ter. along the Tigris was in his possession, although under the rule of his successors its extent varied with their constantly changing success. The actual beginning of its powerful position dates from the reign of Rimmon-nirari in 1320 B.C. Calah was founded by Shalmaneser I., his son, and his grandson, Tiglath-Adar I., rose so high that an invasion of Chaldea resulted in the capture of



ASSYRIAN HORSEMEN

Babylonia in 1280. The first Assyrian
empire was founded by Tiglath-
pileser I., his descendant, about 1140.
Success favoured his reign, and it
s at this point that A. rose to the
eight of its early power. Through-
ut W. Asia, from Elam to the
editerranean, from Armenia to
e Persian Gulf, its dominion ex-
nded. Sippara and Upija were
nexed, and Chaldea was made a
butary state. Westwards his
rgies led to the possession of
cia, involving the capture of Car-
mish and the vassalage of the
ad people, with the ownership of
cities of N. Phœnicia. From
point of eminence, however,
ecline set in. The succession
ssur-bel-Kala, his son, with an
nistration as weak and futile as
ther's was strong and irrepress-
aw a decay as rapid as its rise
een. So tremendous had the fall
hat we find the once all-power-
yrian empire bowing in homage

to the Armenian monarch. This
condition was not permitted lon
continue. A new dynasty, foun
by Assur-dân II. in 930 B.C., c
again caused the fallen empire
raise itself above the horizon. A s
cession of wars, cruelly carried o
under Rimmon-nirari II. and Ass
natsir-pal, again led to the recove
of the old supremacy of A. Besid
the restoration of all the former prov
further annexations were made
N.E. Armenia and Kurdistan. Th
cap. was removed during the middl
empire from Assur to Calah, an
gorgeous buildings were constructe
by the kings. Assur-natsir-pal has
been found to have been the most
outrageously cruel of a line of kings
remarkable for their cruelty. Utter
ruthlessness and disregard for human
suffering seem to have been characteristic of Assyrian rule. An Assyrian code found by the German Oriental Society, which in 1910–16 excavated the site of Assur, is far more harsh than the Babylonian code of Hammurabi. By the time of Shalmanese
II. the dominance of A. had spre
throughout the whole of W. Asi
and it was during this reign that
series of synchronisms was create
between Assyrian and Hebrew annals.
Still further additions were made to
the ter. under his son, Samas Rimmon II. (823–810 B.C.), and now for the first time the Assyrian met the approaching Aryan tribes. Strangely enough, the turning point of Assyrian power coincides with a solar eclipse, records of which are found in the Assyrian eponymous canon. A spirit of revolt became manifest, and a new method of gov. proved the saviour of the country under Tiglath-pileser III. The revolution, however, was still dormant, and showed itself again shortly after in a general revolt of the provs. Sargon, Tiglath's second successor, ascended the throne

with one object nearest his heart. That was, the conquest of the Babylonian kingdom. After a bloody succession of affrays he accomplished his desire. The successful invader then built a splendid palace for himself of extraordinary grandeur at Dûr Sharrukin. Explorations of it have resulted in the discovery of some beautiful sculpture, which form to-day one of the most valuable acquisitions of the Louvre. In 675 the Assyrians embarked upon one of the most important campaigns connected with their history. It resulted in the subjugation of the Egyptian ter. With this event the whole of the anct. world came under one rule, and it is not surprising that the idea of a universal empire for the whole world was now born. The statue of the king Esar-haddon was carved in the rocks at Baal-Rasi, and an inscription was engraved recording the event. In 669 B.C. Esar-haddon died, during a second Egyptian campaign. Of his abilities as a ruler, it is sufficient to say that no Assyrian king had exhibited such a high standard of administrative talent together with military genius. His son, Assur-bani-pal, during his reign continued the campaign and embarked upon fresh ones with a success that is almost monotonous. With all his military exertions he had time to devote to the patronage of arts and letters. Indeed, with his reign the culminating point of Assyrian power is reached. Its lofty achievements had elevated it to a rank supremely high, and it now reposed in the zenith of its glory. A severe blow was now aimed at the empire. His brother had been installed viceroy during the absence of the army in other lands. He took advantage of the moment to organise a gigantic revolt. The Elamites, Arabs, and Egyptians joined forces, and for five years the revolution waged. At the end of that time the Assyrians had conquered the revolutionists and destroyed the allies. But the effort had been more than ordinarily weakening in its effect. So vast an achievement could have only one consequence, gigantic though the military resources of A. were. Everywhere the foundations of Assyrian rule were shattered. The viceroy of Babylonia declared himself king, and his successor Nabopolassar, whose son was Nebuchadnezzar, in the face of all authority avowed his independence. The last Assyrian king of note was Esar-haddon II. Inscriptions testify to the invasion during his reign of a formidable army composed of the united forces of Aryan and Turanian tribes, Medes, Gimmorians, and Armenians. A period of anarchy followed the death of Assur-bani-pal, and A. now became a prov. of Media, after the destruction of Nineveh.

The religion of A. was simpler than that of Babylonia, though of course it originated from the Babylonian. In character it was polytheistic, yet without the innumerable deities of the pantheistic creed. Assur, the national god, was at the head. He was regarded as the spiritual founder of the race. Ignoring the lesser deities, the gods of A. may be divided into two principal triads. First is the 'Nature' triad. A description of this group is contained in the 'Chaldean creation tablet,' and comprising *Anir*, the father of all the gods, who was regarded as the progenitor, termed 'the heaven'; *Bel*, called 'the lord of the world, who was the ruler of the earth; and *Hea*, who was one of the most prominent of the Assyrian gods. He was termed 'lord of the sea,' and was the lord of wisdom and knowledge. Next is the celestial triad, containing the 'moon god,' *Sin*; he was called the 'lord of laws'; the god of the sun, *Shamas*, whose appellations include 'the judge of heaven and hell,' 'the lord of light.' Among Assyrian gods Shamas was one of the most worshipped. The morning and evening hymns to him constitute the most perfect specimens of Assyrian sacred literature. *Istar*, the goddess of the crescent moon and 'queen of the stars,' was the third member of this triad. She is given many and varied attributes, including those of 'queen of war' and 'archeress of the gods.' The most important of the lesser deities was Marduk or Merodach, the son of Hea. The importance of his position as mediator between the immortals and men necessitated a great amount of invocation. Next was Nebo, the god of learning, and his consort Tasmitur. All of the collections of MSS. and other embodiments of learning were dedicated to him. Some of the terms applied to him were 'the wise god,' 'the enlarger of the mind.' The gods of hunting and war were Nergel and Nusku respectively. The title of 'the great devourer' was assigned to Nergel as, in addition to his position as god of war, he was god also of death. The actual rites performed in the worship of these gods resemble those of Babylonia, from which, indeed, they are taken. Among them were morning and evening sacrifice, and the offering of bread, wine, and milk.

It is now recognised that the Assyrians were a branch of the Semitic peoples. Hence they belonged to the identical race as the Syrians,

Phœnicians, Jews, and modern Arabians. Semitism was first estab. in Chaldea some time before the twenty-first century B.C. The pressure of invaders from the E. drove the Semites from Chaldea, where they had been the dominant race. From here they went to the S. countries of Asia Minor, Carthage, Sicily, Spain, and W. Africa. From their traditions clues to a close connection with Ethiopia, Arabia, and the cities of the Euphrates have been discovered. Their language, it is apparent, is related to the northern branch of the Semitic. In certain points it comes near the Arabic.

One of the most important discoveries arising from the explorations that have been organised was that of an extensive library. This was unearthed in the palace of Assur-bani-pal at Nineveh, and it contains thousands of tablets. Numbers of them repose in the British Museum. The name of Assur-bani-pal is inscribed upon most of them, though it is probable that, directly, the presence of such a fine collection is due to the foresight of Esar-haddon. References to old copies have led to the truth that these tablets bear inscriptions taken from former and older specimens, and duplicate copies have been discovered in Babylonia. It is apparent that the object of the library was to act as a preventive to the custom of sending their youth to be educated at Babylonia, where a risk was certain of their imbibing prejudices and assimilating dangerous political ideas. Tablets containing learning on the subjects of old languages such as the Akkadian and Sumirian, text-books on mathematics, tables of square and cube roots, lists of birds, plants, and animals, and geographical works point to the educative influence for which the collection was intended. But in richer and far more nur
the tablets of
number of
the career
Gizdhubar.
s series contains an account of the deluge, and striking similarities to the Hebrew version occur. Here the flood is ordained as
while the
ark is
'the livi
is the la
tion of the rain is seven days. The differences which occur point to the fact that the different versions were taken from one older and common legend and coloured with local facts and landmarks. The resemblance which is borne by later discovered legends describing the phases of creation to Genesis is extraordinary, while the psalms and hymns possess exquisite beauty of diction.

How much the general reader owes to the work of those engaged in excavation it is difficult to say adequately. The vast field in the large and beautiful buildings, the great quantities of inscriptions yet to be discovered, the certainty that many
the past
remain
n inexhaustible fund of material upon which the antiquarian can work. Much has been done, and among the most remarkable monuments now in London at the British Museum are two winged human-headed lions rising to a height of 12 ft., winged human-headed bulls quite as ponderous, winged sphinxes, and the famous black marble obelisk. The subjects of inscription on the last-named include a victory, a prisoner acknowledging submission to a king, and foreign people paying homage, while the animals portrayed include the Bactrian camel, elephant, lion, and rhinoceros. The work in bas-relief is of a quality unexcelled in oriental art. It is characterised by a spirit of accuracy, grace, and artistic touch difficult to realise as work of such an age. The Assyrian kings being great fighters and hunters, the favourite themes of the sculptor are the marching of an army, an attack, a pursuit, a siege, the fording of rivers, lion-hunting, and the counting by secretaries of the heads of game taken in a hunt, or the estimating of prisoners of war. In the ruins of Assur-bani-pal's great palace at Nineveh, a series of such sculptured bas-reliefs has been found, and is now to be seen in the British Museum, illustrating the hunting prowess of the great king. Quaint concessions are sometimes made. An instance is the drawing of five legs to a bull in order that from every point of view four may be seen, and similarly in order to dispel confusion arising from the portrayal of a ladder placed against a wall, it is turned to face the observer. There is little to be gathered, however, about private life from the work. The principle of the arch, the use of the level, and the construction of aqueducts and drains were accomplishments all known to the Assyrians, while their ornaments exhibit skill in the working of metal. Assyrian architects possessed a great advantage over the Babylonian, in that marble was procurable in large quantities, whereas the Babylonians had to rely solely on brick. Senna-

cherib, early in the 7th century B.C., built a wonderful palace at Nineveh, and left inscriptions describing the progress of the work. His palace, and that of Assur-bani-pal, have both been excavated, but little of the actual city of Nineveh has been explored. The palace of Sargon II. at Khorsabad (Dûr Sharrukin) is another splendid example of Assyrian architecture. Excavations have also been carried on at Assur and at Nimrud, or Calah, but the sites of other Assyrian cities are as yet hardly touched.

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Ast, Georg Anton Friedrich (1778–1841), a great Ger. scholar and teacher, was *b.* at Gotha and *d.* at Munich. He went to the University of Jena in 1798, where he studied philosophy and philology. In 1802 he became an academical lecturer at Jena; and in 1805 was appointed professor of anct. literature in the University of Landshut, which institution was transferred to Munich in 1812. He wrote many philosophical and philological works, and during the latter part of his life gave most of his time to the study of Plato. His *Platon's Leben und Schriften* is an excellent work on Plato. In 1809 he commenced to edit separate dialogues of Plato; and from 1819 to 1832, he pub. a complete edition of Plato, with Lat. translation, and a commentary. His *Lexicon Platonicum* was pub. 1834–39.

Astacus, a genus of decapod crus-taceans. *A. serratus* is an Australian crayfish; *A. gammarus* (or *Lomarus vulgaris*) is the lobster (*q.v.*). An astacian is a member of the family, and an astacite is a fossil crayfish.

Astarte, *see* ASTORETH.

Astatic Couple, two magnetised needles with their moments nearly equal and their axes nearly opposite. The couple usually sets nearly north and south.

Astell, Mary (1668–1731), English authoress, *b.* at Newcastle-on-Tyne. Her uncle educated her in Lat., Fr., logic, mathematics, and natural philosophy. She finished her studies in London, and pub. in 1697 *A s[erious] proposal to the Ladies, where[in a] method is offered for the improv[ement] of their minds.* Her most impo[rtant] work, however, was *The Chri[stian] Religion as Professed by a Daugh[ter of] the Church of England.*

Asten, Frederick Emile d' (1842–...), a Ger. astronomer, was *b.* at Colo... and *d.* at Leningrad (St. Petersbu[rg]). He studied at Bonn University un[der] Argelander. His prin. studies w[ere] concerned with asteroids and come[ts].

Aster, a large genus of Compos[itae] universally grown. The China A. i[s a] species of the allied genus Callisteph[us] and not of the A., though it is som[e]times called *A. Chinensis*; it grows [in] China and Japan, and is proper[ly] known as *C. hortensis*.

Aster, Ernest Ludwig von (1778–1855), was *b.* at Dresden in Oct. and *d.* at Berlin in Feb. His fame rests upon his engineering abilities, which he devoted to military purposes. Both of the fortresses of Coblentz, and that of Ehrenbreitstein were the result of his genius.

Asteria, or **Star-stone**, the name applied to a stone which, when cut in the form of a dome, shows a star of six rays. Especially used of an imperfect variety of sapphire, which is bluish-grey in colour and is milky or opalescent.

Asterias (Gk. ἀστήρ, star) is the name of a genus of starfishes, of family Asteriadæ and phylum Echinodermata. *A. rubens*, the five-rayed starfish, is common to the N. Sea, *A. glacialis* to other European seas. Starfishes are found throughout the world.

Asterisk, a sign used in writing and printing resembling a small star. It usually marks the omission of words, or for the purpose of drawing attention to a footnote.

Asterism is the name given to the optical phenomenon of a star-shaped figure which is exhibited by some crystals. Asteriated sapphire gives rise to this phenomenon by reflected light, and some forms of mica by transmitted light. A. is also the name of an oriental div. of time, about a fortnight, and also the name of any group of stars smaller than a constellation.

Asteroids is the name given by Sir William Herschel in 1802 to what should more properly be termed, as they are sometimes, planetoids. These planetoids, now usually known as minor planets, are, as this latter name indicates, a numerous group of very small planets not visible to the naked eye, situated in the solar system between Mars and Jupiter. The discovery of Uranus by Herschel in 1781, which first broke through the old opinion that the number of planets

was complete, and the gap between Mars and Jupiter which Bode's law (*q.v.*) indicated should be filled by some planet, gave an impetus to the search for a new planet, which resulted in the discovery by Piazzi at Palermo on Jan. 1, 1801, of the first and largest of the A., Ceres. On March 28 of the next year Olbers at Bremen discovered Pallas; on Sept. 1, 1804, Harding of Göttingen found Juno; and on March 29, 1807, Olbers found the fourth planetoid, Vesta. It was not till Dec. 8, 1845, that Hencke at Driesen discovered Astræa, and he added a sixth to the list in Hebe, found on July 1, 1847. Since that date no year has passed without the addition of some A. to the list, and at the present time over a thousand are known, and apparently there is no limit to their numbers. M. Stookant estimates that there are at least 50,000. The introduction of the photographic method by Dr. Max Wolf in 1891, now exclusively used for detecting these bodies, has enormously accelerated their discovery: *e.g.* in 1908 117 were found. The photographic plate is fixed to a telescope worked by a mechanism which follows the apparent motion of the 'fixed stars.' It follows that if the plate be long exposed, any heavenly body with a proper motion will be detected owing to the fact that its image on the plate will be a short streak instead of a round disc. The four largest As. are Ceres, Pallas, Vesta, and Juno, whose diameters are respectively 480, 306, 241 and 121 m.: the diameters of the majority of the As. are considerably less than 50 m. and Shapley and Nicholson have detected and measured one whose diameter is 3 m.; this is, therefore, the smallest planet whose dimensions have been ascertained.

The *total* mass of all the As. probably does not exceed one-thousandth the mass of the Earth and in any se must be less than that of Mars, r otherwise noticeable perturbations Mars in its orbit would be detected. ere appears to be no lower limit the size of the A., a fact which icates that they are meteoric ner than planetary bodies. This upported by the fact that their ts are often very eccentric, *e.g.* of Pallas is inclined at 35° to ecliptic. st of the A. are fainter than the magnitude, and it is surmised they are irregular masses of and no A. appears to possess nosphere. s makes the nearest approach sun, and is of great importance termining the solar parallax. the discovery of the larger A. it was suggested that they their origins in the breaking u a larger planet. A later sugge was that the A. were origi distributed in a ring round the (cf. Saturn's rings), and that per bations by the planet Jupiter br up the ring, giving rise to the pres A., but it is not possible to st whether either theory is correct.

Asterophyllites (Gk. ἄστηρ, sta φύλλον, leaf), fossil plant of t equisetaceous Calamites. The bra ches are in verticils and the leafle equal. The plants are found in Ca boniferous and Devonian formations

Asthenopia, weakness of the muscl of the eye or of visual power, due to over-use, anæmia, or errors of refraction.

Asthma, a paroxysmal affection of the bronchial tubes characterised by cough, laboured breathing, and a feeling of suffocation. There is little known about the cause of the disease; but in 50 per cent. of all cases it is a hereditary affection, and is therefore probably due to a constitutional peculiarity, such as a singular sensibility of the local muscular fibres to spasmodic contraction. The immediate cause of a paroxysm may be the inhalation of an irritant, such as chemical vapours, smoke, fog, dust, and emanations from plants or animals; gastric or intestinal disturbances; emotional excitement or increased blood-pressure; or the presence of some chemical substance or toxin acting on the respiratory centre.

The paroxysm usually comes on at night and at a particular time. The patient has a feeling of suffocation, sits up in bed and grasps the knees, or bends down with the palms on the bed so as to raise the shoulders; if able, he may rush to an open window, or take up an attitude on a chair which his experience has shown him is conducive to easier breathing. The face is pale and anxious, and the eyelids, lips, and finger-tips livid, owing to insufficient oxygenation. The breathing becomes whistling and slow, and the chest may become distended, owing to inability to expel the air. The length of the attack varies in different individuals, and the subsidence of the paroxysm is usually abrupt and somewhat unexpected.

To bring relief during the paroxysm it is necessary to remove the cause, if possible. An overloaded stomach should be treated with an emetic, and sometimes relief is obtained by administering a calomel purge followed by an enema. The breathing should be eased by free ventilation and the adoption of a suitable posture, the choice of which is best left to the

patient. A whiff of chloroform or amyl nitrite, a cup of hot, strong coffee, a dose of hot alcohol strong enough to induce a mild intoxication, the inhalation of fumes of nitre-paper, tobacco smoke, cigarettes made of stramonium, belladonna, or lobelia, or burning pastilles of the same, may produce relief in different cases. Each patient usually has some pet remedy which he has found efficacious, and it is the wisest plan to follow his wishes.

Few systems of permanent treatment seem of any avail. If the purse permits, it is generally possible to find a climate where particular individuals are free from attacks, but no general rule can be given. On the assumption that it is a nervous affection, some physicians have advocated a system of breathing drill, which consists of a slow, deep inspiration and an expiration aided by compressing the chest with the hands so as to expel all the air.

Asti, a tn. of Piedmont, in the gov. of Alexandria. It is situated on the l. b. of the Tanaro. It is an episcopal see. A feature of the city is a large Gothic cathedral. The trade in silk and woollen fabrics, hats, leather, and agric. produce is extensive. Around the tn. is a wall much dilapidated. Its wine, vino d'Asti, enjoys a reputation for its excellence. The history of the tn. goes back to 400 B.C., when it was famous for its pottery. Pop. 28,200.

Astigmatism, that condition of the eye in which rays of light from an object are not brought to a focus at one point. It is usually due to inequality of curvature of the meridians of the cornea. This may be caused by imperfections in the lens, unequal contraction of the muscles, or a defect in the curvature of the retina. The condition is treated by the use of cylindrical glasses with the axes arranged as determined by an oculist's test.

Astle, Thomas (1735–1803). He made a name in antiquarian circles, and was an authority upon palæography. He was appointed keeper of records in the Tower of London 1783. He wrote the *Origin and Progress of Writing.*

Astley, Sir Jacob, Baron (1579–1652), a Royalist commander in the civil war. He took part in the Thirty Years' war, winning considerable distinction. He was famous for a characteristic dictum delivered as a prayer usually before battle, 'O Lord! Thou knowest how busy I must be this day. If I forget Thee do not forget me. March on, boys!' An example of his scrupulous honesty was his refusal to take part in the second civil war lest he should break his parole.

Astley, John (*d.* 1595), master of the jewel house. He held a confidential position in the household of Princess Elizabeth. He was a friend of Roger Ascham. He was the author of the *Art of Writing, etc.*

Astley, Sir John Dugdale, Bart. (1828–94), Eng. soldier. He served with distinction in the Crimean war, and retired as lieutenant-colonel. He published *Fifty Years of my Life*

Astley, Philip (1742–1814), *b.* at Newcastle-under-Lyme, England, and *d.* at Paris. He was well known as a horse-tamer. He began life as a cabinet-maker, but soon joined a regiment of light horse in Holland. He finally settled in London, and developed a prosperous business as circus-proprietor. The establishment was known as 'Astley's.' Dickens mentions it in the *Old Curiosity Shop.*

Astley Bridge, a tn. of Lancashire, England, 3 m. N. of Bolton, with cotton-spinning and bleaching industries. Pop. 8503.

Astolphe is the name of an Eng. prince, one of the most famous paladins in Ariosto's poem. He was changed into myrtle by the magic of Alcine, but delivered by the fairy Melissa. Another fairy gave him a horn which caused all who heard it to flee; armed with this, he accomplished prodigious exploits.

Astolphus, King of the Longobards (750–756 A.D.). He aimed at driving the Gks. from Italy; he took Ravenna, expelled the exarch, and conquered the Pentapolis, a part of the present March of Ancona. In 752 he fought against Rome, but Pope Stephen II. arranged a truce with him. A. broke the truce, but Pope Stephen was assisted by Pepin, king of the Franks, who defeated A., concluded a treaty with him, and returned to France. In 755 A. again marched against Rome, but besieged in Pavia by Pepin, he made peace, and gave up the exarchate, which was bestowed by Pepin to the see of St. Peter.

Aston, Sir Arthur (*d.* 1649), Royalist general. He helped to put down the Scottish rebellion. During the civil war he fought at Edgehill and defended Reading.

Aston, Francis William (*b.* 1877), British chemist. Awarded the Nobel Prize for chemistry in 1922. Distinguished for researches in electric discharge in gases, isotopes, and other physical and chemical topics. Mackenzie Davidson medal of the Röntgen Society, 1920; Hughes medal, Royal Society, 1922; Paterno medal, Rome, 1923. Publications include *Isotopes* (1922) and numerous

papers, contributed to scientific magazines.

Aston Manor, a municipal and parl. borough of Warwickshire, England. Its manufs. include motor accessories, paper, and beer. It was incorporated in 1903, but the charter was annulled in 1911, when it became incorporated in the city of Birmingham.

Astor, John Jacob (1763–1848), an American merchant, *b.* near Heidelberg, Germany. During his early years he assisted his father, who was a butcher, following this vocation by piano and flute making. He emigrated to America in 1783 and settled in New York. Acting on the advice of a fur trader, he embarked on the same trade. He gradually enlarged his business, and amassed an enormous fortune. In 1811 he founded a settlement at the mouth of the Columbia R., for the purpose of establishing a central depôt. It was seized by the Eng. in 1813, an event which forms the theme of Washington Irving's *Astoria*. His munificence was on a par with the colossal size of his fortune. The Astor library was given by him, and forms to-day part of the New York library.

Astor, John Jacob (1864–1912), an American capitalist, soldier, and inventor, the fourth of the name, *b.* at Rhinebeck, New York. He served on General Morton's staff (1894–96); in the Spanish-American War during the Santiago campaign (1898). He lost his life in the *Titanic* disaster of 1912. He pub. *A Journey in other Worlds: a Roman of the Future*, 1894.

Astor, Viscountess, Nancy Witcher (*b.* 1879), wife of Viscount A. of Cliveden, whom she married in 1906. Her first husband was Robert Gould haw, to whom she was married in 897 and whom she divorced in 1903. aughter of Chiswell Dabney Langrne of Virginia, she was born at irador in that State. She was the st woman to sit as a member of Imperial House of Commons ough not the first to be elected, t honour falling to Countess rkievicz, a Sinn Feiner who never eared at Westminster), being reed for Plymouth in 1919 and at y general election since that time. always manifested a keen interest e drink question. Published *My Countries* in 1923.

or, Waldorf, Viscount (Cliveden) 879), eldest son of William orf, first Lord A. M.P. for outh 1910–19. Has held many linate ministerial posts, and eful work as chairman of the nentary Committee on the ence of Consumption, one e of which was the establishsanatoria under the Insurance Acts. On succeeding his father Viscount A., his wife, Nancy La horne, was returned for Plymou Controls the important Sunday ne paper the *Observer*.

Astor, William Backhouse (179 1875), eldest son of John Jacob, th merchant, the greater part of whos fortune he inherited and increased b real property investments. The build ing for the Astor Library, to which h gave over half a million dollars, was erected under his direction. Sometimes known as the 'Landlord of New York.'

Astor, William Waldorf (1848–1919), a British American capitalist, *b.* in New York. Assumed management of the Astor estates in 1871. Elected to the New York Assembly in 1877, and to the Senate in 1879. From 1882 to 1885 he was a minister to Italy, where he wrote two romances, *Valentine* and *Sforza*. In 1890 he succeeded to an estate valued at $200,000,000. In 1893 he bought the *Pall Mall Gazette*, and founded the *Pall Mall Magazine*. In 1899 he became a British subject. Subscribed large sums to various war funds. Gave £20,000 to Oxford Univ. Created a peer in 1916, and Viscount in 1917.

Astoreth, or Astarte, the Gk. and Rom. name for the Phœnician Venus, whose cult is synonymous with that of Ashtoreth, 'the abomination of the Sidonians' (2 Kings xxiii. 13), of the Gk. Aphrodite, and of the Assyrian Ishtar. She appears to have been considered as the goddess of fertility and fruitfulness, and is typified in the form of a cow. The moon was also identified with her. The worship of A. was full of licentiousness, and is regarded in the O.T. as a type of wickedness. Her chief temples were at Erech, Nineveh, and Arbela.

Astorga, a city of N.W. Spain, in the prov. of Leon. The Rom. name for the tn. was Asturica Augusta. Pop. 5000.

Astorga, Emanuele d', Baron (1681–1736), musical composer, *b.* at Palermo. His patron, the Duke of Parma, wrongly suspected an intrigue between his daughter and A., and he was sent to the court of Leopold. He *d.* at Prague. His masterpiece is a *Stabat Mater*. It is certain that he carried on the style of composition set by his master, Alessandro Scarlatti.

Astoria, a tn. in Clatsop co., Oregon, U.S.A., at the mouth of the Columbia R. It is the oldest American settlement in the Columbia valley, and takes its name from its founder, John J. Astor. Salmon tinning and lumbering are the principal industries. Was seized by British in 1813,

but restored two years later. Pop. 14,027

Astrabad, or **Asterabad**, a walled tn. in the province of the same name in the N. of Persia. It is situated at the foot of the Elburz Mts., and is 25 m. S.E. of the Caspian Sea. For long it was the residence of the Shah's ancestors, the Kaja princes. Pop. 28,000.

Astræa, the 'star-maiden' in Gk. legend. A daughter of Zeus and Themis. She was the last of the goddesses to leave the earth, which she did on the advent of the bronze age. She is immortalised among the signs of the zodiac as Virgo.

Astragal (from the Gk. ἀστράγαλος), a moulding used in architecture, and usually applied to the upper end of the shaft of a column, and to its base. It is also used in the entablatures of the Roman Doric, the Ionic, Corinthian, and Composite orders. The use of the A. is to bind the parts of columns and entablatures together, both at the top of the shaft, where the capital commences, and at the bottom where the base terminates. In Grecian architecture an example is found in the base of the Ionic temple of Minerva Polias at Priene.

Astragalus, the milk-vetch of Britain, is a genus of Leguminosæ common to Europe, Africa, Asia, and America. They are thorny plants, living on dry soil. *A. verus* and *A. gummifer* produce gum-tragacanth.

Astrakan, the name of a government and its cap. in the S.E. of Russia. The pop. of the government is about 1,315,900. Its area is 91,327 sq. m. The country, watered by the Volga, consists to a large extent of brackish lagoons and steppes. The climate is hot and dry, there being practically no rainfall all summer. The chief occupation of the people is shing; herrings, sturgeon, and cavire are exported in great quantities. alt is extracted from the marshes of e steppes, and is one of the chief instries. A., the cap., pop. 149,000, situated on the l. b. of the Volga. hile formerly it was the only tradcentre with the country beyond Caspian, the overland routes of nburg and Tiflis have destroyed some extent its monopoly. The ease, however, in petroleum exs has improved its commerce. great markets and bazaars of A. mong the most crowded trading-s in the world. The city, algh unsanitary, is picturesque. mingle E. and W., and the s are a gorgeous panorama alleled in variety of scene, nost magnificent sight of all is nal, with its barges laden with nner of merchandise. The city gives its name to the fur wh procured from the young P lamb.

Astral Spirits, the animating ciples of the heavenly bodies ac ing to ancient eastern belief. The trine of the existence of such sp was accepted by a great nu of the Jews, Gks. and Roms., tho such beliefs were among these peo always looked upon with suspic by the authorities. In media times these doctrines became v widely spread. A. S. were then c ceived as fallen angels, or, at lea powers who had less kinship w heaven than with hell. These spir were intimately concerned with t affairs of mortals, and could be bour by magic to their service.

Astringents, remedies which caus contraction of muscular fibre and con densation of the tissues, mostly by coagulating albumin. They are used to check hæmorrhage externally or internally, and diarrhœa. The most important are tannic acid and gallic acid, the mineral acids and most metallic salts.

Astrocaryum, a genus of Palmæ found exclusively in S. America, is remarkable for the number of prickles it bears. *A. murumuru* produces an edible fruit; *A. airi* is a useful timber-palm; the fibres of the leaves of *A. tucuma* are valued for fishing-nets.

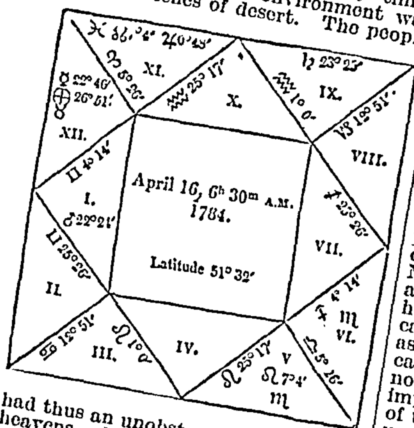
Astrocrinus (Gk. ἄστηρ, star, κρίνος, hair), a fossil genus of blastoid echinoderms, of family Astrocrinidæ and order Irregulares. They are found in the carboniferous limestone of Yorkshire and Scotland.

Astrolabe (Gk. ἄστηρ, star, and λάβειν, to take), an instrument used by astrologers for taking the altitude of the heavenly bodies. As. were not only used by astrologers, but also in portable form by travellers for astronomical and topographical calculations. Chaucer in 1391 wrote a prose treatise on the A., for the use of his son. There was also another species of A. for marine calculations of the lat. Columbus used such an instrument on his voyage of discovery.

Astrolabe Bay, a large bay on the N.E. coast of New Guinea.

Astrology, a science concerned with the heavenly bodies; in modern times the science is confined to the art of divination from the position of celestial bodies, but in anct. times it embraced also what is now called astronomy. Formerly the two departments of the subject were distinguished thus: (1) Natural A., consisting in the calculation of the movements of the heavenly bodies. (2) Judicial A., consisting in the study of the supposed influence of the stars, etc., on human life and destiny. A.,

therefore, was a curious mixture of science and quackery, or rather, A. was the pseudo-science out of which the science astronomy evolved. A curious parallel is seen in the research of the mediæval alchemists out of whose pseudo-chemistry true chemistry evolved. A. reached its zenith among the Babylonians—so much so that subsequently Chaldean became a synonym for astrologer. Babylonian life was in early times nomadic, and the environment was vast stretches of desert. The people



had thus an unobstructed view of the heavens. From the elementary observation that the sun sustains life throughout the world developed the belief that the other heavenly bodies, too, governed nature, and were the abode of the divine element. Just as A. was being superseded by astronomy in Babylon, its influence spread westward and began to colour the thought of the Hebs., Gks., and the Roms. Thus in the N.T. we
read that wise men of the E., *i.e.*
Chaldeans, followed the star that
roclaimed the advent of Jesus.
Among the Gks. judicial A. never had
very firm footing, but among the
Roms. it found a superstition that
adily sympathised with it. The
athematici, or Chaldean astrologers,
ere always a source of annoyance to
authorities, and in Tacitus we
d that though they were expelled
n Rome repeatedly, they always
urned. The nucleus round which
science of A. grew was the belief
the divine energy was mani-
d in the movements of the sun
he planets. The correct interpre-
n of the position of these was a
o the will of Heaven. Gradually
stem was enlarged. The relative
on of the planets and their posi-
elative to the fixed stars and

constellations gave more infor
As the field of observation w
the amount of information to
rived from the observation
widened with it, until it em
every experience of human life.
information was augmented b
theory of repeated omens, *e.g*
postulation that if a certain e
happened while a certain planet o
pied a certain position, the recurre
of that position of the planet w
also foreshadow a recurrence of
event. The reaches of astrolog
information were also extended
the association of ideas. The div
planets were associated with vario
passions and things, and the positio
of the planets would therefore deno
a state of the passions, etc., wit
which they were associated. To tak
a concrete example, Mars is associated
with war and strife, and Venus with
love; the juxtaposition of the two
planets might therefore indicate some
calamity arising out of some union.
Moreover, these planets were associated with the various parts of the human body, hence medicine became a department of A. Thus Mars, as being the tempestuous planet, became associated with the bile. Again, not only the position of the planet was important, but which particular sign of the zodiac it occupied, or, in other words, which house of heaven. The days of the week were assigned to the various planets, etc.—Sunday to the sun, Monday to the moon, Tuesday to Mars, Wednesday to Mercury, Thursday to Jupiter, Friday to Venus, Saturday to Saturn. (These relations are more immediately apparent from the French names of the days of the week.) In the middle ages the astrologer was considered by many people of learning and dignity, as well as by the uneducated, as being almost omniscient. The astrologer could foretell the destiny of the individual by calculating which star was in the ascendant at the time of his birth. The ascendant was that sign of the zodiac which is nearest the eastern horizon at the time of the event, and that star was most important which rose at that precise moment, *i.e.* was in the ascendant. Limitless information could thus be derived from these details regarding the character, physique, and destiny of the individual. The art of A. has not yet died out, though for long it has been in ill repute. In recent years, as with other occult sciences, attempts have been made to revive it on scientific principles. However, whether A. will do further services to mankind in the future, time alone can decide, but its services to mankind in the past are undeniable, despite the bad

putation the art has earned in modern mes, for it was out of A. that the eat science of astronomy evolved.

Astronomer Royal, the head of reenwich Observatory, appointed by e prime minister under the royal gn-manual. The office was estab. 1675, and is at present held by Sir rank Dyson, formerly A. R. for Scotnd and director of the Edinburgh oyal Observatory, who in 1910 succeded Sir W. H. M. Christie, K.C.B.

Astronomy (Gk. ἀστηρ, a star, μος, law) is the science which eats of the heavenly bodies and l phenomena therewith connected. ıch phenomena include their movement in the sky, eclipses arising thereom, their influence on the earth and ı each other, and changes in their mposition. A. is the oldest, most act, and most widely embracing of l the sciences, and, as the great aplace truly said, presents the longt chain of discoveries. In addition, tends to become more and more ternational in character, and as inancing this it may be mentioned at in the remarkable campaign conıcted in 1900–1 for the purpose of etermining the solar parallax by obrvation of the movements of the inor planet Eros, no fewer than ty-eight observatories took part. inally, it may be claimed that A. is e most ennobling science, a sentient finely expressed by the poet oung in the line, 'An undevout tronomer is mad.' A., rising in the ists of antiquity, attained to the osition of an exact science under the ks., but during their time, and for any centuries after, it was closely lied to, if not almost overlaid by, e pseudo-science of astrology. owever, with the revival of learning the sixteenth century and the owding discoveries which resulted om the invention of the telescope at e beginning of the seventeenth, A. as able to slough its astrological overing even as chemistry arose om alchemy.

A. in modern times has been geneılly divided into three main divs., nown as (1) practical, (2) theoretical, nd (3) physical. The first deals with e observation of the celestial obects, and necessarily therefore conerns itself with the instruments and bservatories used in this work. The econd, or theoretical A., is practially a branch of higher mathematics, nd is the application of the fundaıental laws of gravitation to the obervations of the practical branch. 'he third branch of the science, the hysical, trenches on the domain of hemistry, and is the application of e other, and by comparison, terresrial, sciences to the heavenly bodies. This branch of the subject is the most recent in date, but of great and increasing importance, and serving to weld into one harmonious whole all the sciences. Each of these three main divs. has its sub-divs. according to the nature of the celestial object observed, or the instrument used. The known heavenly bodies are the sun, the moon, the planets, the satellites (or moons) of the planets, the *asteroids* (*small planets*), *meteors* (shooting stars), and comets, all of which belong to what is known as the solar system, and the bodies immeasurably more remote, the stars and nebulæ. The four chief instruments used in observations are: (1) Fixed telescopes, graduated for ascertaining the position of the heavenly bodies on the celestial sphere; (2) equitorially mounted and movable telescopes, capable of following the movements of the heavenly objects; (3) the spectroscope, for ascertaining the physical composition of the body observed; and (4) the photographic camera, for securing a permanent and trustworthy record of celestial objects and also for recording objects too faint to be perceived by even the optically-assisted human eye. These sub-divs. have their special names and their practical, theoretical and physical sides. What is known as solar physics is the study of the sun's physical condition; the mapping of the moon's surface is known as selenography; and the name sidereal A. attaches to the special study of nebulæ and the so-called fixed stars.

From the foregoing paragraph it will be seen how vast is the subject we have to deal with. It is impossible that an article under the heading A. in a work of reference such as this should be other than the mere outline of the science, and, in the main, a chronological record of discoveries. For details the reader is referred to the articles on the different categories of heavenly bodies, the instruments used, and the names of constellations and astronomers. The prin. articles are as follow: ALTITUDE; ASCENSION, RIGHT; ASTEROIDS; AZIMUTH; BRAHÉ; COMET; CONSTELLATION (*see also* under various names); COPERNICUS; DAY; EARTH; ECLIPSE; ECLIPTIC; EQUINOXES; GALAXY; GALILEO; GRAVITATION; HERSCHEL; HIPPARCHUS; HORIZON; KEPLER; LAPLACE; LATITUDE AND LONGITUDE; LIGHT; MERIDIAN; METEORS; MOON; NEBULÆ; NEWTON; OBSERVATORY; OCCULTATION; OPTICS; ORBIT; PARALLAX; PERTURBATIONS; PHASES; PHOTOGRAPHY; PLANETS (*see also* under various names); POLES; PRECESSION; PTOLEMY; REFLECTION; SATELLITES; SEASONS; SEXTANT;

SOLAR SYSTEM; SOLSTICE; SPECTRUM AND SPECTROSCOPE; STARS; SUN; TELESCOPES; TIDES; TRANSIT INSTRUMENT; YEAR; ZODIAC.

Before turning to the history of A. it will be well to take a brief glance at the position of the earth in the solar system, and of that system in the universe. In the course of the last twenty years, our knowledge of the universe has been increased enormously, especially with regard to the origin of the stars, their composition, their histories, their sizes, and their temperatures. The science of Astrophysics has brought about this enlightenment, and an attempt is made, in what follows, to describe the results of the recent progress, made possible only by new methods of attack and by great improvements in the design and technique of astronomical instruments. The centre of research has shifted from the solar system, but we must briefly remark on that system, and refer the reader for further details to the articles on PLANETS, COMET and METEOR. The solar system is supposed to have had its origin in the approach of another sun to our present sun: the gravitational attraction between two such bodies would be enormous, and just as our small satellite, the Moon, causes tidal waves in our oceans, so the approaching sun caused great tidal waves in our sun, and streams of matter were ejected from it. This matter rotated round its parent and in the course of time condensations took place which served as nuclei for the building up of the planets, which continued, and now continue, o rotate round the sun at different listances from it. Kepler and New-on (*q.v.*) studied their orbits and ronounced the laws which govern heir motion.

There are eight major planets, d more than a thousand known nor planets or asteroids (*q.v.*). e solar system consists of the tral star or the sun, with the nets and their attendant satellites, , in addition to these, there are eors and comets. Named in the r of their distances from the sun, major planets are Mercury, s, the Earth, Mars, Jupiter, rn, Uranus, and Neptune; the oids lie between Mars and er. The Gks. gave them the name erers (Gk. πλάνης, a wanderer). he planets shine by the light reflect from the sun, and they be approximately circular orbits it. The orbits are really al, and the sun is in one focus ellipsis. They rotate in the irection round the sun, and their orbits lie in approximately same plane. The period of rotat varies in the 'year' of the plan Mercury being only 88 days, compared with our 365¼ days. addition to this rotation, the plane turn on their axes, and it is th which causes our seasons.

The mean distance of the Eart from the sun is 93,000,000 miles Mercury is about 37,000,000 mile from the sun, while the furthes planet, Neptune, is about 280,000,000 miles from its parent. Conditions such as temperature and the nature of the atmosphere of the planets depend on their histories as well as on their positions with respect to the sun; there is only a possibility of life such as we know it on the planet Mars, the remaining planets are either too hot or too cold or again devoid of an atmosphere capable of supporting life.

The Earth is approximately a sphere, nearly 8000 miles in diameter, the sun is more than a million times as large, and is 93,000,000 miles away. It is our nearest star, and yet it is exceedingly small by comparison with the giant stars known to us. The giant known as Betelgeuse, the bright red star in the constellation of Orion, is so great that if it replaced our sun, it would more than fill the whole of the space between the Earth and the sun. Some idea of its magnitude may be gathered from the fact that if a bullet could travel with undiminished speed round the Equator of Betel geuse, it would take nearly 60 year to return to its starting point. It apparent size is small because it i so far away from the Earth, namely 600 *light-years* away. Light travels at a speed of 186,000 miles per second, and takes rather more than 8 minutes to travel from the sun to us; by one *light-year* we mean the distance that light would travel in one year, *i.e.* nearly 6 billion miles. When we look at Betelgeuse we see it as it was 600 years ago: we are, as it were, looking back into the past, but it is less irksome to think of the distances of the stars in terms of *light-years*! There are at least 3000 million stars, and, with the exception of the sun, which is about 8 light-minutes away, the nearest one is Proxima Centauri, 4·1 light-years away, while we know of globular clusters of stars which are 220,000 light-years away from the Earth.

Modern A. has realised that what the ancients called the 'fixed stars' are not fixed, but most with velocities much greater than that of our sun; though the constellation of Orion appears to the naked eye to be in

the same position it occupied 1000 years ago, the stars are really moving quickly, and it is merely because they are so very far away from us that they appear to be fixed. In addition to the stars, there are nebular regions in the stellar universe, *e.g.* the Milky Way (on which *see* NEBULA); it is sufficient to point out here that the present view is that the evolution of the star begins in some nebula and the star that condenses from the nebula is a diffuse mass of gas of low density and comparatively low surface temperature (3000°C.). According to the classification of the Harvard Observatory, the star is now a red giant of type M, *e.g.* Betelgeuse. The evolution of the star through the successive stages known as M, K, G, F, A, B, and characterised by typical differences of spectra, is accompanied by increase of temperature and a contraction of mass, so that when type B is reached, *e.g.* Sirius, the surface temperature is about 20,000° C. and the density still somewhat less than that of water. The giant has now entered dwarfdom, and it begins to cool as it contracts further, and it goes through the same spectral stages in the reverse order, though it is now called a dwarf, because it is much smaller than the giant which emits the corresponding type of spectrum. Our sun is a dwarf star of type G, with a surface temperature of 6000° C. It has still to pass through the K and M stages before its life as a star is completed. The density of a dwarf increases with its age, and there are stars so dense that a tiny portion of no more than the bulk of a match-box weighs as much as a ton. The evolution of the stars is a slow process, and we cannot accept anything less than 1000 million years for the age of the sun. About three-quarters of the stars are dwarfs, and one quarter are giants, progressing towards their maximum temperature. This surface temperature is very small by comparison with that of the star's interior temperature, which is about 40,000,000° C.

Binary stars and pulsating stars. Many stars which appear single to the naked eye are found to be double stars when examined in a telescope or by the spectroscope. These stars are known as binaries, and consist of two stars revolving in orbits about their common centre of gravity. Much of our recent knowledge of the stellar universe is due to the pulsating stars known as Cepheid variables. Although Michelson in 1920 constructed his telescopic in-
terferometer, and by mea
measured the diameter of Be
few stars appear large enoug
terrestrial observer to be m
in this way. The star δ-Cep
prototype of stars that occu
parts of the universe, kn
Cepheid variables. They are
which swell and contract in a
of 5¼ days, and their pulsatio
made known by the corresp
changes in their luminosities.
as Eddington points out, the
of a tuning-fork is characteris
the fork, and in a similar wa
period 5¼ days is characteris
stars of identical structure and lu
osities. The Cepheid variables t
fore serve to measure the distanc
various parts of the stellar univ
by comparing the apparent lu
osity of any Cepheid star with
of a near star of the same type w
distance can be measured by fin
its parallax (*q.v.*). The realisat
of this fact has enabled astronom
to 'measure up' the universe in
uncertain manner.

We have had, so to speak, a bird
eye view of the solar system, a
have the universe in perspective. W
are now in a position to apprecia
the history of astronomical discover
which, as has been indicated, is al
largely the history of the invention o
the instruments used and the progres
of mathematics. Of the influence o
the discoveries of the astronomer o
the mind of man, of their reaction
on philosopher, theologian, geologist
physicist, and chemist, we cannot here do more than allude to in passing, and must content ourselves by observing that their effect has been profound.

A. is, as we have said, the most anct. of the sciences. Nations who are known to have cultivated it before the Christian era are the Chinese, Hindus, Chaldeans, Egyptians, and Gks. The Chinese made it a matter of politics, the next three of religion, and all, except the Gks., applied it to astrology. With the Gks. A. was treated merely as any other science, and for this reason, perhaps, it made a more rapid advance with them than among their contemporaries. Which nation was the first to study A. will perhaps never be finally determined: all we can say is, that wherever a people emerged from savagery, traces can be found of astronomical observations. For each of the above-mentioned nations the claim is made for the honour of being the first to study the science. The Chinese annals go back as far as 2857 B.C., but of astronomical phenomena they record hardly anything except the eclipses of the sun and the appearance of comets. The fact of the motions of the planets

was known to the Chinese, as was also the Metonic cycle, but not the precession of the equinoxes till about A.D. 400, or about 550 years after its discovery by the Gk. astronomer Hipparchus. A record of the conjunction of five planets shows that observations were made by the Chinese at about 2500 B.C. The burning by order of the Emperor Tsin-Chi-Hong-Ti (221 B.C.) of all scientific books may have destroyed evidence of still further astronomical observations. Neither the Hindus nor Egyptians contributed to A. anything of outstanding importance, but from the accuracy with which the Great Pyramid of Cheops faces the cardinal points it is clear that the Egyptians possessed, even at the most remote period no little astronomical knowledge. But it is probable that the Chaldeans were the nation which, next to the Gks., made the most extensive study of the heavens. Certain it is that they had the Metonic cycle, and it is thought that Meton, the Gk. astronomer of the fifth century B.C., who gives his name to this period, may have obtained the cycle from them. They had quite early in their history measured the celestial sphere and portioned out and named the sections (signs) of the belt of the heavens through which the sun, moon, and planets apparently move, a belt known as the zodiac. Though their observations never attained to the accuracy of the Gks., being, in fact, of the roughest kind (the time of eclipses, for instance, being given only n hours, and the part of the diameter eclipsed only within a quarter), they vere, nevertheless, the earliest trust-orthy observations, and in the hands Halley, an Eng. astronomer, led to e discovery of the acceleration of e moon's mean motion. Besides eton's, these Babylonian astrono-rs also discovered other cycles, ong them being the Saros, *i.e.* the iod of eighteen years seven months r the effluxion of which eclipses of and moon will again occur at the e intervals. It is not certain when Saros was discovered, but it is able that it was some centuries e the Christian era, and the st eclipse (excluding doubtful se accounts) is one referred to Babylonian tablet as having ed in 1062 B.C. Simplicius, a ntator on Aristotle, tells us lexander the Great found in Babylon containing ob-ns of eclipses for nearly 2000 or to the conquest of that city These he transmitted to his tor Aristotle, but Ptolemy, astronomer of the Alexan-ool, mentions only a few of them, and none prior to 720. undoubtedly among the Chal A. was gathering a definite shape among the instruments they use find the use of the clepsydra ('w clock') as a clock, and of the gno as measuring solstices.

To the Gks., who took the lea the anct. world in so many ot matters, must go the honour of ra ing A. to the dignity of an exa science. From Thales (640 B.C.) Hipparchus (190–120 B.C.) was bui up a wonderful body of exact astro nomical knowledge which for fifteen centuries was not appreciably added to. Thales, who founded the Ionian or physical school of philosophy, and one of the Seven Wise Men, predicted the eclipse of the sun which happened in 584 B.C. in the reign of Alyattes. He may be said to be the founder of Gk. A., but for many reasons we shall reserve for Hipparchus the title of Father of A. It is probable that Thales in predicting the solar eclipse did so by means of the Chaldean Saros (mentioned above). He also held, and is the first of whom we have record of so holding, that the earth was a sphere, that the stars were fiery bodies, and he also taught his countrymen how to steer their vessels by means of the Little Bear, an asterism nearer the Pole Star than the Great Bear, which the Gks. had hitherto been satisfied with as an indication of the N. Anaximander, his successor, is credited with asserting that the earth rotated on its axis, and that moonlight was but reflected sunlight. Pythagoras (500 B.C.) promulgated the idea, which was not generally accepted till many centuries afterwards, that the earth and other planets circulated round the sun. He also was probably the first to teach that the evening and morning star were the same planet. Meton (432 B.C.), already mentioned, introduced the cycle bearing his name, which Calippus, one hundred years later, improved. Eudoxus of Cnidos (370 B.C.), according to Pliny, brought the year of 365¼ days into Greece, and wrote some astronomical works. Aristotle (384–322 B.C.), perhaps the greatest all-round scientist among the ancients, wrote on A., but his works were lost. We know, however, that he gave a correct interpretation of the phases of the moon. The fourth century B.C. saw the foundation at Alexandria of the school of that name. The Alexandrian astronomers were encouraged in their task by the Ptolemaic dynasty. Their work was characterised not so much by new theories or discoveries, but by a long series of painstaking, connected accurate observations

ally we may say, in geography, held supreme sway over scientific men from his own time down to the sixteenth century. Finally, although he did not originate it, he was the chief exponent of, and gave his name to the system of planetary motions known for centuries as the Ptolemaic System. His chief title to fame is that he corrected and improved on the work of his predecessors, particularly Hipparchus, but he made sev. original discoveries of very great importance. A voluminous writer on many subjects, his astronomical work, the *Almagest* (*q.v.*), summed up practically all the astronomical knowledge of the ancients, and it is, in fact, practically our chief source of information on this subject. The prin. discovery of Ptolemy is that of the 'evection' of the moon, an inequality such as would be caused by an alternate increase and diminution of the eccen- ricity of the moon's orbit. He also iscovered the refraction, and made ome tolerably correct experiments to etermine its law, explaining the ap- arent enlargement of the discs of the n and moon when near the horizon. he projection of the sphere of Hip- rchus he extended, and, in fact, tered into the investigation of ery point which Hipparchus had ched, verifying or altering. He empted to account for the motions he planets by supposing them to e uniformly in circles, the centres vhich circles themselves moved ormly round the earth. The e Ptolemaic system is now on cientific scrap-heap, but for his taking work as an observer and e historian of A. the name of my will always be honourably nbered.

h Ptolemy the originality of the hool ends, as indeed does all t. astronomical science. With e of Christianity and the de- f the northern barbarians on res of the Mediterranean, civil- suffered an eclipse. A dense scientific ignorance hung over and in such congenial en- nt the bastard sciences of al- nd astrology flourished. But rkest hour science has never votees, though for a while it our in strange households. d torch of scientific truth alight by the Arabs—an d non-Christian people. It of our duty here to anim- the dislike, to put it A. evinced by the more the Christians from the patia (end of fourth cen- o that of Galileo (seven- ury). We mention these passing because the first-named lived in the period immediately succeeding Ptolemy, and is, moreover, worthy of mention as being the first woman astronomer and mathematician on record. With Galileo the Dark Ages ceased and practical modern A. commenced. But of him we will speak later.

That fanaticism is by no means monopolised by some of the followers of the Cross is shown by the action of the early Moslem calif Omar, who, by his burning of the Alexandrian Library in A.D. 640, destroyed the accumulated knowledge of centuries. To what extent A. shared in the general loss it is difficult to estimate, but whatever may have been the shortcomings of the great Omar, they were more than compensated for by his successors in both the Eastern and Cordova califates. By their encouragement of original scientific research and of translation into Arabic of the works of the old Gk. authors, and by, in some cases, actual personal labour in this field of knowledge, the califs have earned an honourable position among enlightened princes. The line of Arabic astronomers may be said to have begun in the reign of Al-Mansor, the calif who built Bagdad, in the year A.D. 762. In his reign were begun translations of the Gk. writers, and with nearly the same instruments, and the same theory, as Ptolemy, commenced a period of four centuries of astronomical observation. In the reigns of the great calif Haroun al-Raschid and his son Al-Mamun, both of whom were students of the science, great encouragement was given to A. The most illustrious of this school was Albategnius, or Al-Batani (A.D. 880), and he is, beyond all doubt, the only distinguished observer of whom we know anything between Hipparchus and Tycho Brahé. He discovered the motion of the solar apogee, corrected the value of the precession, the solar eccentricity, and the obliquity of the ecliptics. He pub. tables, was the first to use sines (instead of chords) and versed sines, and found the length of the year more accurately. The influence of the Arabian school spread to Persia, Turkestan, China, and Spain as Islam advanced on its conquering mission in these countries. In Persia in the eleventh century flourished the famous astronomer-poet, Omar Khayyám. He suggested a reformation of the calendar, which, though not adopted, was, it has been asserted, more accurate than that of Pope Gregory XIII. Ulug Beg (1433), a prince at Samarcand, pub. the most correct catalogue of stars known till his day, but, on the whole, though assiduous observers and great mathe-

system, was for the last two years of Tycho's life his colleague in his work. It was with Tycho's accurate observations to work upon, and following Tycho's much-needed advice to apply himself to the deduction of causes from phenomena, that Kepler made his marvellous discoveries.

Unlike his master, Kepler (1571–1630) was a Copernican. In addition to A., he studied and made some discoveries in optics and physics, but it is chiefly as a mathematician that Kepler excelled. Too much importance cannot be attached to his three laws of planetary motions, laws which, though not proved till Newton's *Prin*
later, laid
modern *A*
Kepler's laws are in essence marvellously simple, and, like simple fundamentals, are beautiful. As the geometrician derives pleasure from the contemplation of, say, Euclid's 47th proposition (Book I.), 'Theorem of Pythagoras,' so the astronomer feels a pleasurable emotion by allowing his mind to dwell on Kepler's third law. The first two laws were announced in Kepler's work, *The Motions of Mars*, pub. in 1609, and the third in his *Harmonice Mundi*, 1619. The laws are as follows: (1) *The planets move in ellipses, having the sun in a focus.* (2) *The imaginary straight line joining a planet to the sun* (*radius vector*) *sweeps out equal areas in equal times.* (3) *The square of the time of revolution of any planet about the sun is proportional to the cube of its mean distance from the sun.*

In the hands of Galileo Galilei (1564–1642), or, as he is more generally known by his Christian name alone, Galileo, the telescope settled the problem of the planetary system. Galileo, a great astronomer, was nevertheless more than an astronomer, and may be said to have invented the science of dynamics. Quite early in life (1581) he discovered the isochronisms of the pendulum, an invaluable principle which led to the more accurate construction of clocks. In 1609 Galileo made a telescope from a general description of a magnifying instrument made by one Jansen in Holland. He was indubitably the first to apply the telescope to A., and on the very first time that he used it he discovered three of the satellites of Jupiter (Jan. 7, 1610). A few nights later he discovered a fourth moon to Jupiter. In the same year he saw spots on the moon (mts., etc.), resolved the Milky Way into stars, discovered the rings of Saturn and the phases of Venus. The following year he observed sun-spots, and from them concluded that the sun rotated on its axis. None of these observations required a great amount of skill, and all the phenomena mentioned may be easily observed by any amateur with a small telescope, but they served to bring down with a run the fast-crumbling fabric of the Ptolemaic system. For it was an obvious analogy to make, that if the sun rotated on its axis, why not the earth? If Jupiter could carry his four moons along with him



GALILEO

round the sun, why could not the earth carry its moon? And, moreover, the resemblance between the phases of Venus and the moon was yet one more argument in favour of the Copernican theory. For further details of the life and discovery of this most interesting man the reader is referred to the article GALILEO. Therein he will find food for reflection on the age-long struggle between science and sacerdotalism.

It will not be necessary to emphasise the profound change that came over A. with the introduction of the telescope. Even with the small light-grasping power of the primitive instrument of Galileo the whole face of the heavens was altered, and it was only a matter of time until the continued improvement of this wonderful instrument should, as it were, induce the universe to yield up more and more of its secrets. But for a long while the telescope was a small in-

refracting telescope did not have an object glass of a greater diameter than 3¾ in., a size which scores of astronomical amateurs possess to-day. The search for a form of telescope that would obviate the drawbacks of chromatic light led to the invention of the reflecting telescope; the Gregorian by Gregory in 1663, and the Newtonian by Sir Isaac Newton in 1669. As the mirror of the reflecting telescope offered less difficulty in construction, and was consequently cheaper, for a long time much more progress was made with the reflector than the refractor. In 1723 Hadley had made a reflector with a mirror of 5½ in., but it was Sir William Herschel (1738–1822) who made telescopes with mirrors ranging from 6 in. to 4ft. The largest reflector yet made was that constructed by Lord Rosse, who in 1848 constructed one of 6 ft. diameter and with a focal length of 53 ft. The two largest refracting telescopes are both in America. That of the Lick Observatory has a 36-in. aperture, and that of the Yerkes Observatory 40 in. The progressive increase in the size of the telescope has enabled the surface of the sun, moon, and planets to be surveyed in a more and more detailed manner. It enabled Gassendi in 1631 to observe for the first time the transit of Mercury over the sun's disc, and to measure the diameter of Mercury. Eight years later Horrocks and Crabtree first observed a transit of Venus over the disc of the sun, and the former ascertained the diameter of that planet. The telescope enabled Cassini in 1665 to determine the time of the rotation of Jupiter, and in the following year he determined the rotation of Mars and made a first approximation to that of Venus. In 1675 Roemer discovered the velocity of light from observations of Jupiter's satellites (a discovery since confirmed by other means in the physical laboratory), and the same year saw the founding of the world-famous Greenwich Observatory, with Flamsteed as first astronomer-royal. The first transit telescope was used by Roemer in 1689, two years after the publication of Newton's *Principia*. In this epoch-making work Newton provided the mathematical proof of Kepler's laws and laid down the law of gravitation. It is, of course, too technical a matter to enter into here. 1705 was the year in which Halley first predicted the return of the comet to which his name has been given, and it duly turned up again in 1758, the year predicted. Flamsteed's great work, *Historia Cœlestis*, issued in 1725, made a great step forward in sidereal A., giving a catalogue of the stars such as had never before been published. Sir William Herschel is, however, generally spoken of as the founder of sidereal A., his motto being 'Whatever shines should be observed.' With his giant reflecting telescopes he undertook a complete survey of the stars in the northern hemisphere, in the course of which he found the planet Uranus, 1781. The story of the observation of the stars in the southern hemisphere is bound up with that of his son, Sir John Herschel and his son's forerunner, Lacaille. The latter, a Fr. astronomer, went to the Cape of Good Hope in 1751, and he remained there four years. He observed nearly 10,000 stars and formed fourteen new constellations. Sir John Herschel, carrying on the work of Lacaille, did for the southern hemisphere what his father had done for the northern, and pub. in 1847 a complete survey of the southern heavens. The first few minor planets (asteroids) were discovered in the first decade of the nineteenth century, and the planet Neptune in 1846.

By the middle of the nineteenth century the position of A. stood thus. The whole surface of the sky had been carefully surveyed, and catalogues prepared giving thousands of stars and scores of nebulæ. The solar system was known as we now know it except for the discovery of a few small satellites and additions to the swarm of minor planets. The motions of all heavenly bodies were referable to the laws of gravitation, enunciated by Kepler and elaborated by Newton and Laplace. Large and accurate telescopes were in existence for examining the surface of sun, moon, and planets, and many of their features had been recorded. Observational A. was beginning to yield fewer results. How great a progress had been made in telescope construction may be judged from the statement of the present astronomer-royal (Sir Frank Dyson's *Astronomy*) that the moon could be seen through modern telescopes as it would appear to the naked eye at a distance of about 200 m. At this distance a circle a mile and a half in diameter would appear as large as the whole moon does to the naked eye at its distance of 240,000 m., so that towns, lakes, etc., if they existed on the moon could be distinguished. What, then, would be the line of advance for the latter-day astronomer? The answer is that he turned his attention to the sidereal universe and to an examination of the composition of the heavenly bodies.

The dictum of the biologist, 'Want creates organ,' applies here. The need for instruments to aid man in his self-appointed task of plumbing the universe resulted in the application of

the spectroscope and the photographic camera to astronomical uses. The chemist came to the aid of A. with his sensitive photographic plates and knowledge of the spectra of earthly elements, and the astronomer repaid his brother scientist by his discovery of new elements in the sun: elements unknown to mundane chemistry. For a more detailed account of celestial and terrestrial spectroscopy the reader is referred to article SPECTRUM AND SPECTROSCOPE: it will suffice here to explain the principle of the spectrum. Light is capable of being split up into component parts in the same way as sound. If we hear a band playing, our ears are able to distinguish the notes of the cornet, horn, bassoon, violin, double bass, clarionet, and so forth, though all these instruments are being played simultaneously. In like manner, a beam of light if passed through a glass prism will be split up into a band of multi-coloured light, ranging from violet at one end to red at the other, the colours shading into each other by insensible gradations. These colours correspond to the length of the vibrations of the light waves and the time of vibration, and as these different vibrations are produced by the light emitted by the various chemical elements in a state of com- bustion, we are enabled by this means o tell roughly the composition of the uminous body. If we still further ex- and the band of light by passing it rough one or two more prisms, we nd on careful examination that it is nerally crossed by a number of ight or dark lines. Each of these es stands for an element in com- stion, and the lines produced by t element are always in the same ition on the spectrum. Thus the ctrum of common salt shows two ht yellow lines, and no matter in t part of the universe (sun, earth, tars), common salt, if in a state of bustion sufficient to produce light, always show these two bright w lines in the same position, or, amounts to the same thing, two bands in the same position. The rery of this fact by Fraunhofer ne development of this discovery rchoff laid the basis of solar and chemistry. By this means we ll the physical construction of uminous body in the universe, r it be sun, star, comet, nebula, eor. And as the spectrum is ible of being photographed, he photographic plate can re- e ultra-violet light not visible uman eye, great accuracy can ved in these observations. er remarkable result is ob- om spectrum analysis. We n how the lines on the spec- trum show the composition of th body emitting light, but anothe feature of the spectroscope of equal, if not surpassing, importance to the astronomer is that known as Doppler's principle. This principle enables the motion and direction of the light-emitting body to be measured. According to the number of light vibrations per second the position of a line in the spectrum is determined. If the light-giving object approaches the spectroscope, or *vice versâ*, more than the usual number of vibrations will reach the observer in each second. On the other hand, if either the source of light or the spectroscope recede from each other, the number of vibrations will be less than the normal. This departu e from normality is shown by a shifting of the lines (not in relation to each other, but of the whole lot) on the band of chromatic light: on approach the lines shifting towards the violet end; when receding towards the red end. Sir Wm. Huggins was quick to see how this principle could be utilised in A., and was the first so to apply it. This principle has enabled us to tell whether stars are approaching or receding from the sun; at what rate they are doing so; the rotation of the sun on its axis and the rotation of Saturn's rings. And as the spectrum can be photographed a permanent and accurate record can be made, and, as above mentioned, part of th spectrum invisible to the human ey can be recorded on the photographic plate.

Astrophysics, armed with the spectroscope, made great strides during the latter part of the last century, when it was discovered how to analyse spectra. Since 1895 atomic physics has produced epoch-making results, and as one of the most striking advances, made in 1913, was the interpretation of the spectra of the element it may be imagined that Astrophysics, too, received a new interpretation and the present century may be called the golden age of Physics and A., for a knowledge of the atom is invaluable in interpreting the physics of the stars. As in physics, so in A., the recent progress has been due to a large number of learned astronomers, and for details of the history of A. during the present century the works mentioned in the following brief bibliography should be read. Mention must be made of the Californian observatories, which are modern observatories, containing the finest instruments in the world, and, in particular, the Mount Wilson Observatory, which contains Michelson's famous telescopic interferometer, with which he first measured (in 1920) the angu-

lar diameter of a star, and to Eddington, the English astronomer, whose work on *Stars and Atoms* has established him as not merely one of the greatest of English astronomers, but one of the greatest of all astronomers. *Bibliography*: Eddington's *Stars and Atoms* (1927); Macpherson's *Modern Astronomy* (1926); Hutchinson's *Splendour of the Heavens* (1930) —a really beautiful book with admirable photographs from the best observatories in the world: the amateur and student will appreciate the publication of Spencer Jones's *General Astronomy* (1922).

Astrophel (Gk., star-lover): (1) The title under which Sir Philip Sidney wrote his sonnet-sequence to Stella, or Penelope Devereux. The poems, written 1575–83, appeared in 1591. (2) The name of an elegy by Edmund Spenser on the death of Sidney.

Astruc, Jean (1684–1766), a Fr. physician and Bible critic, was *b.* at Sauve in Languedoc. In 1710 he became professor of anatomy at Toulouse, and in 1717 he was appointed to the chair of medicine at Montpellier. In 1731 he became Regius professor of medicine at Paris, and his fame as a lecturer spread throughout Europe. Of his numerous medical works his most famous deal with sexual disorders and kindred subjects, *e.g. De morbis venereis libri sex* (1736). Besides being a physician, he was also a philosopher and biblical critic, and wrote *Conjectures sur les mémoires originaux dont il paraît que Moyse s'est servi pour composer le livre de la Genèse*—a rational treatise on the ...dual sources of the Book of Genesis.

Astura, a vil. on a peninsula, once ...n is., on the coast of Latium, Italy, ...nd near Antium. It is at the mouth ...f the Astura R., 39 m. S.E. of Rome. ...emains of Rom. villas are excavated ...n the spot, and valuable traces of ...ct. civilisation have been revealed. ...cero had a villa at A., to which he ...treated after the blow of his ...ughter's death. Augustus and ...berius both frequented it, and, ...cording to Suetonius, both here ...ntracted their fatal illnesses. On ... site of the villa there is now a ...y tower.

...sturias, an anct. prov. of N. Spain. ... country is very rich in mines. ... inhab. are insular, and having ... free from contact with other ...les, are the purest representatives ...e Spanish race. The eldest son ...e King of Spain is called 'Prince ...e Asturias,' a phrase coined on ...gy with the English 'Prince of ...'.

...turias,' The. The name of a ... hospital ship which the Gers. attempted to torpedo off Hav... February 2, 1915. The *Ast...* plainly showed the Red Cross, ... all other externals of its chara... Later the Gers. issued an 'apology... appease hostile judgment of neut... The British Admiralty retaliated... March 8 by announcing that t... would not extend the honoura... treatment which they had accor... to the crew of the *Emden* to ... officers and men rescued from *U b...* *8*, the delinquent boat.

Astyages, grandfather of Cyru... According to Xenophon, A. and Cyr... lived amicably together, but anoth... version of the story relates that A... fearing his grandson, exposed hi... and he in turn dethroned his grand... father.

Astyanax, the young son of Hecto... and Andromache, and sometimes ... called Scamandrius. At the sack of ... Troy he was cast from the ramparts, ... that he might never restore his ... grandfather's kingdom.

Astylar (ἀ, without, στῦλος, pillar), an architectural term signifying without columns. Thus A. Italian buildings are in contradistinction from those buildings which are decorated with columns. The A. class of design was introduced into England by Barry in the Travellers' Clubhouse and Reform Clubhouse, London.

Asuncion, or Assumption, cap. of the republic of Paraguay, S. America. The city takes its name from the feast of Assumption in 1537, which was the date of its foundation. The port has communication with Buenos Ayres by steamers. The climate is hot, but is not unhealthy. The city was once the seat of the Spanish gov. of the region, and has a college, library, and many fine churches. A. has been the scene of many struggles. The Jesuits and the church here came into serious conflict. Fiancia made himself despot of the city. A, too, was the theatre of a war with Brazil. Pop. 99,836.

Asylum, *see* INSANITY.

Asymptote (ἀ privative, σὺν, together, and πίπτω, to fall), a mathematical term used to denote a line which approaches nearer and nearer to another, but only coincides with it at infinity. Familiar examples of the A. curve are those obtained from the graph of the tangent and also from the hyperbola.

Asyndeton, is a figure of rhetoric which omits the connectives for the sake of emphasis, and in order to bring out the climax. The stock example of A. is Cæsar's famous message, 'Veni, vidi, vici'—'I came, I saw, I conquered.'

Asystaton, the characteristic sophism of the liar.

Atabapo, riv. of Venezuela, joining

the Orinoco at San Fernando de A. after a course of 140 m. It forms part of the boundary between Colombia and Venezuela.

Atacama, a prov. in N. Chili, area 30,729 sq. m. There are some of the world's most valuable silver and copper mines in the prov. Salt is exported in large quantities. The A. desert is a vast stretch of barren country extending over the provs. of A., Los Andes, etc. It is volcanic in character, but is one of the richest territories of the globe, having quantities of silver, copper, lead, nickel, borax, iron salt, etc.

Atacamite, a rare mineral originally found in the desert of Atacama, in S. America, and also occurring in Saxony and on the slopes of Vesuvius and Etna. It is a copper oxychloride, $CuCl_2,3Cu(OH)_2$, crystallises in the orthorhombic system, is usually green in colour, has a hardness of 3, a sp. gr. of 3·7, and is worked as a copper ore.

Atahualpa, son of Huayna Capac of Peru and 'last of the Incas.' He was deprived of the throne of Peru by the bar sinister of his birth, as he was of the blood of the Incas only on his father's side, his mother being a captive princess of Quito. His father therefore was obliged to leave his throne to his legitimate son Huascar, but to his favourite son A. he left the newly conquered kingdom of Quito. A quarrel sprang up between the two brothers, and A. was victorious, but at the moment of his victory Pizarro, the Spanish pioneer, landed in Peru. On Nov. 15, 1532, he requested A., now Inca, to pay him a friendly state visit, but took him prisoner by a horrible massacre of his body-guard. Treachery was followed by treachery, and though A. inally professed himself Christian, e was strangled in 1533.

Atakpame, a gov. and mission tation in the interior of Togoland, W. Africa, having a large trade in ubber. Pop. about 8000.

Atala, one of the most beautiful d famous mosques of British India. is situated in Jaunpur, in the nares div. of the United Provs. e mosque is known as the A. Mas-, and was built in the year 1408 by ahim. Its cloisters and façade are gnificent specimens of Indian hitecture.

talanta, an Arcadian huntress, and hter of Iasus and Clymene. Her er, desiring a son, had exposed her fancy, but she was nourished by -wolf. She became the devotee temis, goddess of maidenhood he chase. She took part in the ng of the Calydonian boar, and ther once more recognised her daughter. She was urged to give her hand in marriage, but be warned against marriage, and kn ing she was without peer in swiftr of foot, she compelled all suitors contend with her in the foot-race. who lost must die; he who won wou be her lord. Milanion conquered h by a ruse. Aphrodite gave him thr golden apples, which he let fall duri the race, and A., overcome with the beauty, stooped to pick them u She thus surrendered herself t Milanion.

Ataman, *see* HETMAN.

Ata-Melik, whose complete name was Ala-eddin-ata-Melik al-Jowain (*c.* 1227–82), was *b.* in Jowain, near Nishabur, Khorassan. He became the confidant of Mangu Khan, and afterwards of Hulaku, by whom he was made prefect of Bagdad 1258. He was accused of peculation, and put into prison by Abaka Khan, the successor of Hulaku. He was, however, released by Sultan Ahmed, the successor of Abaka Khan. Ahmed was soon afterwards defeated by Argun, the son of Abaka Khan, and this news no doubt brought about the death of Ata-Melik. He was the author of *Jehankushais* ('The Conquest of the World'), a history of the Moguls, and a manuscript, said to contain the greater part of it, is in the Royal Library at Paris (Quatremère, *Mines de l'Orient*, vol. i. p. 220).

Ataulphus, or **Ataulf** the 'Father-wolf' (derived from *atta*, father, and *vulfs*, wolf, a name now corrupted into Adolf), king of the Goths and brother-in-law of Alaric. He had a successful military career, and conceived the brilliant idea of blending the Rom. and the Gothic races, that Rom. civilisation might moderate the barbaric hardihood of the Goths.

Atavism (Lat. *atavus*, a grandfather three times removed), a biological term used to denote a reversion to some remote ancestral type. It is a species of heredity common to animal and plant life. Thus coloured blood may come out after its apparent disappearance for many generations, or some old family characteristic may make a sudden reappearance. Pure breeds may occasionally breed a common type or in horticulture cultivated species may revert to the common type.

Atbara, the most northern trib. of the Nile. The A. was the theatre of a battle fought between a Mahdist army under Mahmad and a British army under Lord Kitchener. The battle resulted in the capture of Mahmad and the rout of the Mahdists. This victory was followed by the decisive battle of Omdurman.

Atchafalaya, a name applied to an outlet of the Red R., 220 m. long, and

according to derivation signifying 'Lost River.' The origin of the name is the fact that it was supposed to have been the original bed of the Red R. The A. receives also in time of flood the waters of the Mississippi. Its course is southward, and passing through Chetimaches Lake it throws its waters into Atchafalaya Bay.

Atchin, or **Atcheen** or **Achin**, a Dutch prov. in the N.W. of the is. of Sumatra, with an area of about 20,600 sq. m. The is. has a backbone of mt. ranges from which numerous small rivs. descend to the coast on either side. The inhab. of A. are distinct from the other inhab. of the is., and hold themselves aloof. They have an admixture of Arab and Hindu blood. In religion they are Mohammedans and retain the Moslem robe and turban characteristic of the Arabs. They are more industrious and intelligent than the neighbouring peoples, but they are very treacherous and unreliable. The state of the Atchinese is communistic. The ter. was rich in gold and attracted merchants from the sixteenth century, but the Atchinese persistently opposed the establishment of commercial relationship with European countries. Much fighting preluded the Dutch establishment in A. in the year 1875. Better trading terms with Europe are now established. Pop. 736,365.

Atchison, a city of A. co., Kansas, U.S.A., situated on the l. b. of the Missouri, and named after the leader of the pro-slavery party. The city is an important railway centre and supplies are transported from it to all parts of the States. In the city are many flourishing factories and its colleges are numerous. Pop. 13,024.

Atchison, Topeka, and Santa-Fé Railway, U.S.A. A railway system extending through Missouri, Arkansas, Texas, Kansas, Colorado, New Mexico, Oklahoma, and Arizona. The system has now a total mileage of 10,445 m. Only one-half, however, is the property of this company. It was reorganised in 1895–6, after a failure in 1893, and since August 1900 full dividends have been paid on the preferred shares and from 1½ to 2 per cent. on the ordinary shares.

Atchrijeff is the name of a gov. of S. Russia, on the Black Sea. It consists of the Tauric or Crimean peninsula and the Nogay Steppe. The latter is a dry, elevated stretch of land, with a mild climate, and short, but severe winters. There are numerous lakes, and the inhabitants belong to many different nationalities. The only large towns are those of the Crimea, Balaklava, Kaffa, Baktchesarai, etc. The gov. is also called Atchuk, or Atcher. For details of the Crimean peninsula, *see under* CRIMEA.

Ate, daughter of Eris (Strife) and Zeus, a Gk. goddess who represents the infatuation that leads men to ruin. In tragedy her mission is more moral, and instead of being the goddess of destruction she is the personification of retribution.

Atef Crown, a form of head-dress worn by Egyptian deities, consisting of a tall white cap, with a plume on each side, and bearing the solar disc and aræus in front.

Ateles (Gk. ἀτελής, imperfect), a genus of S. American Primates known as *spider-monkeys*. They belong to the family Cebidæ. The thumb is absent (hence their name), the limbs long and very flexible, the tail long and much used in climbing. *A. paniscus*, the coaita, inhabits Brazil; *A. Belzebuth*, the marimonda, Guiana.

Ateliers nationaux, or national factories, are an institution by means of which public works can be carried on by those individuals who are unable to obtain employment. The idea itself is quite an ancient one, dating from Gk. times, but the most celebrated A. N. were those established in France in 1848. The provisional gov., after the fall of Louis Philippe, set up ateliers by means of which all who desired work could obtain it. The immense cost of this procedure obliged the gov. to put an end to it, whereupon the enraged workers rose in revolt, and the terrible days of June 1848 followed. The revolt was suppressed, but only after much bloodshed. These riots took place in Paris; the other towns which had set up A. N. had no such difficulty in suppressing them. The failure of the A. N. has often done service as an argument not only against Socialism but indeed any form of state or municipal industrial enterprise. It must be remembered, however, that MM. Louis Blanc and Karl Blind, among others, allege that the A. N. were never meant to pay, and that from the very beginning they were intended to fail.

Atellanæ fabulæ were an old Oscan type of drama introduced into anct. Rome. These dramas were improvised burlesques from low life. Certain stock characters appeared. Maccus the fool, Pappus the father, and Dossennus the hump-back. They were the only type of play in which a Rom. citizen could act without losing caste, as such. The A. F. lingered after many revivals till far into the empire.

Atempo (It., in time), a musical term used to indicate a reversion to the time at the beginning of a movement, when that time has been

altered, *e.g. ad libitum, a piacere*, or for a longer time, *e.g. più lento, più allegro*, etc.

Ateshgah (place of fire), a place of about 1 sq. m. in area, from the soil of which issues natural gas. It is a place of worship among the Guebres or Persian fire-worshippers.

Atessa, a small, finely-situated tn. near Chieti in the S. of Italy. It has a fine collegiate church and other public buildings of note. Pop. tn. and district 9654.

Atfih, the anct. Aphroditopolis, is an Egyptian tn. situated on the r. b. of the Nile, in the gov. of Ghizeh. Pop. about 3000.

Ath, a tn. on the Dender in the prov. of Hainault, Belgium. It was once a fortified stronghold.

Athabasca: (1) Once a dist., then a ter., but now absorbed in the prov. of Alberta and Saskatchewan. (2) A riv. and affluent of the Mackenzie (also named the Elk or Reindeer R.), and likewise a lake in the prov. of Alberta, Canada. The word A. means 'grassy carpet,' a name applied to the riv. owing to the abundant herbage produced at the delta. The source of the riv. is a small lake at the base of Mt. Brown in the Rocky Mts., called the 'Committee's Punch-bowl.' The A. flows from the mts. in a north-eastward direction, receiving many affluents and the drainage of the Lesser Slave Lake. An interesting feature of the riv. is the point where it takes the 'Great Rapids,' a long slope where the water lows steadily and without cascades. fter a course of 550 m. the A. enters ake A. The lake is shaped like a reat bow with the horns pointing uthward. The main affluent of the . lake is called the Great Slave R., d is formed by the union of the A. d Peace rivs. The Great Slave R. turn flows into the Great Slave ke, and takes the name of the ckenzie R. The A. (lake and riv.) thus part of a great system which ins and waters a vast tract of ada. The Athabasca-Mackenzie, se united length is 2700 m., toer with the recipient lakes, pros most valuable transportation ties.

halaric (516–534), a king of the goths, and grandson of Theo- He ascended his grandfather's e in the year 526, but being only ars of age, his mother, Amalu- a, became queen-regent. Dur- minority he contracted vicious which undermined his con- on and caused his premature

liah, daughter of Ahab, King el, and Jezebel, and wife of n, King of Judah. She inherited her mother's evil instincts and under her influence the cult of Baal spread in Judah. On the death of her son Ahaziah, after a massacre of all her grandchildren except Joash, who managed to escape, she reigned in Israel for six years. Joash deposed her, and she was struck down as she passed from the temple, where she witnessed her grandson's return to the throne.

Athalie, the title of the last tragedy of Racine, written by him in 1691 by the wish of Madame de Maintenon, who desired a play in which sexual love was not mentioned for use in her girls' school at St. Cyr. The drama is founded upon 2 Kings and 2 Chron., and is remarkable for religious fervour and emotional force.

Athamas, son of Æolus, King of Thebes, married Nephele, and by her had Phryxus and Helle. He forsook Nephele for Ino, and by her had Learchus and Melicerta. Ino persecuted the children of Nephele, and Juno in revenge visited A. with madness, whereby he slew his son Learchus.

Athamelik, surnamed Ala Eddin, was a famous Persian statesman and historian of the eighteenth century. He was twice governor of Bagdad, which he much improved during his term of office, building new mosques and canals.

Athanagilde, a captain of the Spanish Goths who *d.* at Toledo in A.D. 567. With the help of a Rom. force sent from Gaul by the Emperor Justinian, he defeated and killed King Agila near Seville in 554. A. then became King of the Goths in Spain, and endeavoured to drive his Rom. allies out of Spain. He was unsuccessful, but reigned fourteen years over that part of the country occupied by the Visigoths. Brunehaut, one of his two daughters, married Siegbert, King of Metz.

Athanaric, a prince of the Visigoths bearing the title of judge. He engaged in a long unsuccessful campaign with the Emperor Valens, and peace was ratified in 369. In 376 he was defeated by the Huns who had advanced into the confines of Europe. A. finally took refuge with the Emperor Theodosius at his court in Constantinople, but died shortly after his arrival.

Athanas, a genus of crustaceans belonging to the Decapoda, taken on the S. coast of England and on the shores of France. Its family is the Alpheidæ and is allied to the *Lysmata*, but differs from it in that its first pair of feet are largest, while the second are the largest in the *Lysmata*.

Athanasian Creed, *see* ATHANASIUS and CREED.

Athanasius (*c.* 296–373 A.D.) was *b.* in Alexandria. His life is distinguished by his steady and notable resistance to the doctrines of Arius, whose followers he usually stigmatised by the name of Ariomanites. Before he was thirty years of age he had distinguished himself at the Council of Nicea (325), and in the year following that council he was made patriarch of Alexandria and primate of Egypt. Arius, who had been banished after the Council of Nicea, was, chiefly owing to the fact that the favourite sister of the Emperor Constantine had leanings towards Arianism, restored to favour. A. was ordered—entreated perhaps would be the better phrase—to restore Arius to Christian communion, but he refused. On this charge and others which concerned his treatment of six of the Arian bishops, and particularly the Bishop Arsenius, he was tried and condemned at Tyre. He flung himself on the justice of Constantine, but was banished for a little over two years to Trèves, whence he was restored by the younger Constantine on his accession (338). At a synod which was held at Antioch it was decided that a bishop deposed by one synod could only be restored by an equal synod, and this decision was immediately applied to A., who was again driven into exile. Part of this exile was spent in Rome, where he quickly gained the sympathies of the western church, and his innocence was upheld by the Italian bishops in council. At a synod convened at Sardica, and at which met representatives of the E. and W., his cause aroused the deepest and angriest feelings, and the beginnings of a separation between eastern and western churches is obvious for the first time. Constans, Emperor of the West, by a hreat of a religious war unless A. was mmediately restored, led to his re-toration by Constantius in 349. Two ears after, however, he was deprived his protector (Constans) by his sassination in 351. Although Con-antius assured the primate of his votion and protection, the next few ars were spent in an attempt to ng about his condemnation not y by the eastern, but by the wes- n church also. By councils which e held at Arles (353) and Milan) his condemnation was brought ut after great difficulty and by the loyment of dishonourable means. n then a great part of the orthodox ch refused to condemn him, and rather into exile. In 356 he was led from Alexandria, which was up to the plunder of the imperial , while A. sought refuge in the s of Upper Egypt amongst men egarded him with the greatest respect and refused to betray For six years he remained in exile 362 during the empire of Julian A turned, but was soon in exile ag Julian hated him, and, in his words, desired his death, giving as reason, 'The contempt that is sho for all the gods fills me with grief a indignation.' A. eluded capture, a again took refuge in the monaster of the Upper Nile. He returned in 3 during the empire of Jovian, and sa for a short break under Valens r mained to carry out his work Egypt until 373. His death wa the signal for the outbreak of re ligious persecution; he had bee primate of Egypt for forty-thre years, and had been in exile fou times. He was the leader of the church during one of its most dangerous periods, and showed by his zeal, his fervour, and his firmness an example which was not without imitation during his own age. As a writer and an orator he had superiors amongst his contemporaries, but as a leader of men and of the church he was without equal. The creed which embodies his doctrines and beliefs was not heard of until some centuries after his death.

Athanasius: (1) Bishop of Perrha. Serious accusations were brought against him by his colleagues, and A. refused to appear when summoned. He was deposed and again *c.* 450, when an attempt was made to re-examine the evidence, he refused to appear on the ground that the jury was predisposed to condemn him. (2) Bishop of Ancyra (360–369 A.D.) through the influence of the Arian Acacius, but throughout his career he was rigidly orthodox, and St. Basil commended him as the bulwark of orthodoxy.

Athapascan, a linguistic family of N. American Indians, inhabiting Canada, California, and the Rio Grande dist., and formerly known as the Chippewayan. It may be divided into three main branches: the Northern, about 8595 strong, in Alaska and Canada; the Pacific, about 895 strong, in Washington, Oregon, and California; and the Southern, about 23,400 strong, in Oklahoma, Arizona, New Mexico, and Colorado.

Atheism, disbelief in the existence of a God. A. should be carefully distinguished from scepticism, with which in the popular mind it is very often confounded. One sect is very apt to charge an opponent sect with A. merely because the doctrines of that sect are not understood. Thus Xenophanes, who rejected the gods of the popular Gk. religion, incurred the charge of A., though his attitude was almost monotheistic. Socrates, too,

was charged with A. because he did not believe in the gods that the city worshipped. Even the early Christians were called atheists by the Roms., because the absence of images and the other familiar appurtenances of worship was to the material Rom. mind incomprehensible. Philosophic A. fails to find evidence of a god manifest in the universe. In Greece positive atheists were the followers of Democritus, Leucippus, and the materialistic schools. In Rome there were very many sceptics, but very few atheists. Lucretius was unique, standing apart from his age and from his race. His book *De Rerum Natura* (On the Nature of Things) is one of the most fervent denials of the divine ever penned. 'Gods' there are, but these 'gods' are not immortal, according to Lucretius, but only beings endowed with a happier and longer life than ordinary mortals. Lucretius had no followers at Rome, and his book was ignored for many generations. In recent times Europe has produced not a few eminent atheists, *e.g.* Von Holbach, and Gustave Flourens. Modern A. falls into three classes: (1) *Dogmatic* A. which positively asserts there is no Go[illegible] maintains that [illegible] is incapable of [illegible] is or is not. (3) *Critical*, which holds that the evidence for Theism is inadequate. Plato first asserted that no one after adopting in his youth the doctrines of A. persisted in such doctrines in old age—a theory that has frequently been reasserted. In India the disbelief in the existence of God is common from very early times. Notably atheistic is the Sankhya system and the more modern Jainism. A. as a system did not have many adherents among the Jews. The Jewish mind was not prone to analyse religious beliefs. Still there are traces of it, *e.g.* Jer. v. 12, 'They have denied the Lord and said, He is not'; and Psalm x. 4, 'The wicked in the haughtiness of his countenance says, He will not require, all his thoughts are, There is no God.'

Atheling, an A.-S. title of nobility used by the descendants of the first invaders, but by and by this title of honour was used only by the members of the royal family, *i.e.* kings and the brothers and sons of kings.

[illegible] ction of th[illegible] an is., in [illegible] Alfred fled (878 A.D.) when oppressed by the Danish invaders. On regaining his throne he founded a Benedictine monastery on the is. in commemoration of his retreat, and portions of it have been excavated. A ring was found bearing Alfred's name, and is now preserved in the Oxford Museum.

Athelstan (*c.* 895–940), son of King Edward the Elder, and grandson of Alfred the Great. He succeeded to the throne in 924, not without opposition. He annexed the kingdom of Northumbria, and then made tributary to himself the kings of Wales, Cumbria, Scotland. His title thenceforth was King of Britain. These dependent kings then conspired against him, but the battle of Brunanburgh, a signal victory for A., put an en[illegible] was the first ki[illegible] to establish a [illegible] by uniting the female side of his line with European princes.

Athena, a Gk. goddess, according to a quaint legend born from the head of Zeus, who, fearing that the child about to be born would surpass himself, had previously swallowed her mother, Metis (counsel). This myth symbolises the intellectual character of the deity. Her distinguishing attribute is the ægis (a shield or cloak), bearing the gorgon's head. Other characteristic symbols are the owl, the serpent, and the olive branch. In Gk. poetry her name is qualified with the fixed epithet *glaucopis*, translated 'grey-eyed,' but probably really signifying 'owl-eyed'—just as the fixed epithet of Hera is 'ox-eyed.' These two epithets may be a survival of totemism. A. was patroness of many arts and divine protectress of many human experiences. She was protectress of Athens, goddess of wisdom, of war, of agriculture, and of the various crafts that belong to women. The story of how she became patroness-deity of Athens is one of the most famous of Gk. legends. Poseidon and A. contested for the honour, and each brought forth a gift-symbol. Poseidon struck the ground and a horse arose, symbolical of war, but A. produced an olive branch, symbolical of peace and prosperity. The latter was adjudged the better gift, and A. became patron-goddess. At Athens to A. in this character was dedicated the Parthenon, the most magnificent example of Gk. architecture, and two magnificent and colossal statues by Pheidias (one in gold and ivory, and the other in bronze) represented her in all her beauty, dignity, and power. As the goddess of wisdom she, along with Apollo, with whom she was associated, is one of the most characteristic of Greek deities. Literature and fine art were under her protection, and it is in literature and fine art that the glory of Greece chiefly lies. In a sterner aspect she was associated with war, but war in which she is concerned is

war waged on the side of justice. Hence she is associated with victory and called the 'bringer of victory.' Ancient art very often represents her contending with the giants. But the milder side of her character is revealed in her association with women's work—chiefly weaving. A., like Diana, remained a virgin and protected the virginity of women. In art she was usually represented in full armour, bearing helmet, spear, shield, and ægis. Her chief festival was the Panathenaic games.

Athenæum: (1) A temple of Athena used as a seat of learning at Athens. (2) A similar institution at Rome, built by Hadrian A.D. 135 for philosophy, rhetoric, law, etc. The name thus began to be applied to colleges in general, *e.g.* at Constantinople and at present at Marseilles.

Athenæum, formerly a high-class literary journal, pub. weekly. After an existence of nearly a century, it was incorporated, in 1921, in *The Nation*, a weekly, (*q.v.*) now called *The Nation and Athenæum*. The *A.* was started by James Silk Buckingham in 1828, but in his hands the paper was not successful. From 1828 to 1832 Charles Wentworth Dilke was one of the proprietors. Others were Hood, Allan Cunningham, and John Hamilton Reynolds. Two years after the paper was started it passed under the sole control of Charles Wentworth Dilke. In 1831 Dilke reduced the price from eightpence to fourpence, and in spite of the duty and the price of the paper this enterprise succeeded. This new departure brought upon Dilke a torrent of adverse criticism. John Hamilton Reynolds wrote: 'My dear Dilke, you astound me with your sale. It is more decided than Milton's *Noon to Dewy Eve* one! From eightpence to fourpence is but a step, but then it is also from the sublime to the ridiculous. . . . Hood and I have been calculating this afternoon, and the result is appalling. To lower below sixpence would in my opinion be n unadvisable course. . . . We are uite against the total change in ur paper constitution which you hreaten.' But in spite of prophecies o the contrary, the reduction proved xtremely successful, and almost rectly the sale was six times as large it had been formerly. However, e starting of the paper had sunk so ich, that it took sev. years to lance the early loss. In the year 35 Dilke increased the number of es from sixteen to twenty-four. s provoked from Allan Cunning- n the words, 'So you enlarge the You already give too much for money.' The best work of Hood Lamb was contributed to its pages. Other writers were Ho Ettrick Shepherd, Leigh Hun William Roscoe. Dilke was no an innovator in the price of the he also tried to make a revolu journalistic principles. He as favour of any publisher, and re to allow his criticisms to be bia any direction. The following ment is characteristic, 'I give y other assurance than the assu given to all publishers, that a book will be spoken of as a good in the *A.*, let who will be the lisher.' In 1846 Dilke resigned editorship of the *A.* and went to rescue of the *Daily News*. The pa continued its successful career kept its reputation as an unprejudi review of Eng. and foreign literatu science, the fine arts, music, and t drama. The thanks of every litera critic are due to Dilke, not only f making the reputation of the *A.*, b for setting an example of rigid i tegrity and honesty in literary crit cism, and laying down the only jus rule that a book ought to speak fo itself to the critic, independently o author and publisher.

Athenæum Club, a famous institution in Pall Mall, and founded in 1824 'for the association of individuals known for their literary or scientific attainments, artists of eminence in any class of the Fine Arts, noblemen and gentlemen distinguished as liberal patrons of Science, Literature, and the Arts.' Membership is attained by ballot-vote or the vote of the committee (restricted to nine new members each year). The club consists of 1200 members, who pay a yearly subscription of fifteen guineas, with an entrance fee of thirty guineas. Attached to the club is a fine library—the finest library in any club. Ten per cent. black balls excludes from membership.

Athenæus, an erudite Gk. grammarian, *b.* at Naucratis in Egypt, *fl. c.* A.D. 200. He studied in Alexandria and Rome. He wrote a miscellany called the *Banquet of the Learned* in the form of conversations of learned guests at a prolonged feast. The book is crammed full of valuable information concerning Gk. letters and science, and is one of the best sources for fragments of lost comedies, etc.

Athenæus, a Gk. writer, probably contemporary with Archimedes. A work by him on engines of war (Περὶ μηχανημάτων) is extant, and printed in the collection of Thevenot. This work is addressed to M. Marcellus, supposed to be the conqueror of Syracuse.

Athenæus of Attalia, a physician who flourished in Rome about the middle of the first century of our era, and estab. the Pneumatic school in

medicine. A few fragments of his writings are preserved by Oribasius and Aetius, and allusions are made to his opinions in the writings of Galen. The theory, which originated with A., and was adopted by sev. other distinguished physicians (Aretæus), derived its name from the *pneuma*, or spirit, a notion of which these physicians made frequent use in their explanations of life and disease. This *pneuma* formed an important principle in the physical science of the Stoic philosophers, from whom the pneumatic physicians seemed to have derived it. The very scanty remains of the pneumatic doctrine do not enable us to judge whether its *spirit* resembled the *vital principle* of some modern physiologists; nor can we appreciate in what manner the Pneumatics conceived the efficacy of this *spirit* as connected with those principles which they admitted in common with other ancient schools, the elementary qualities, heat and cold, which they called active principles, and dryness and moisture, which they termed passive principles. (Leclerc and Sprengel's *Histories of Medicine.*)

Athenagoras, a Gk. Christian philosopher, who flourished in the third century A.D., *b.* at Athens, and taught here and at Alexandria. Best nown by his *Legatio pro Christianis*, ddressed to Emperor Marcus Aureus, in which he defended the Chrisans. He also wrote a treatise of e resurrection. Works trans. by umphreys, 1714.

Athenais (394–460 A.D.), Rom. emess, *b.* at Athens; married Theosius II., 421; retired to Jerusalem, , and *d.* there. After her consion she was called Eudocia. She te several religious poems.

thenion, a Sicilian slave, but by a Cilician, who lived in the latter of the second century B.C. He the overseer to two wealthy ers, and on the insurrection of laves in Sicily (known as the d Servile war, 102 B.C.) he over the slaves under his . Other slaves flocked to his rd, and he soon had 10,000 rs. He assumed the title and a king, and told his followers was destined to reign over He laid siege to Lilybæum, ed in his attempt. He then alvius, another slave-leader, assumed the name of Tryd who had a stronger force The Rom. senate sent L. Lucullus to subdue them, ugh he was at first successs defeated when he laid iocala. Tryphon died, and ed him, but was defeated by Manius Aquilius the consul in 101 B.C. Aquilius ende the war in 99 B.C.

Athenion, who lived in the firs century B.C. was the son of a peripatetic philosopher of the same name by an Egyptian slave. He was set free, and assumed the name of Aristion. He kept a school in Athens, and ultimately became tyrant of that city. He helped Mithridates in his wars against the Romans, and with Archelaus, the general of the king of Pontus, held the city against Sulla. He was afterwards put to death by Sulla.

Athenion, a painter, who was *b.* at Maronea in Thrace. He was a pupil of Glaucion of Corinth. Pliny, in his *Historia Naturalis*, xxxv. 40, speaks of him in very high terms.

Athenion, a comic poet. Athenæus gives a long extract from his *Samothracians*, xxiv. 80.

Athenodorus: (1) Arcadian sculptor, flourished about 350 B.C. Most successful with noble women. (2) Rhodian sculptor of first century B.C. One of the three who produced the famous 'Laocoön.' (3) Gk. physician contemporaneous with Plutarch. (4) Stoic philosopher (74 B.C. to A.D. 7), who had great influence over Augustus. (5) Stoic philosopher of firs century A.D. Keeper of library a Pergamum.

Athenry, par. and mrkt. tn. of Ireland, in Galway co., 10 m. N.W. of Loughrea. Friday is the market day. The area of the par. is 14,950 ac., the pop. 2885. The pop. of the town is 791.

Athens, cap. of ancient Attica and modern Greece, situated on the Attic plain, 4½ m. from its harbour, Piræus, on the Gulf of Ægina. The plain is surrounded by hills; Mt. Hymettus lying to the E.; Pentelicus to the N.E.; Parnes to the N.W., and Ægaleus to the W. and sloping S.W. to the Saronic Gulf. It is crossed by sev. lower ridges, partly occupied by the city itself. The greatest height of these, Mt. Lycabettus, directly overhangs the city, within which are the rocky masses forming the Acropolis and Areopagus. The plain is watered by the Ilissus and Cephissus, both irregular mt. streams. A. is approached on the W. by the 'Sacred Way,' over the plain of Eleusis, and on the S.W. from Piræus, over what was formerly a swamp, and there are railways to Piræus, Laurium and Corinth and a tram-line to Phaleron. This last was the first harbour of A., but it, together with Munichea and Zea, was early replaced by Piræus, now one of the chief ports of the Mediterranean. The city was connected with the ports by the famous 'long walls.'

The original site of the city was undoubtedly the Acropolis, on the summit of which have been found traces of a pre-historic wall. Buildings soon extended to the S. and W. of the hill, and this city, the foundation of which is ascribed to Theseus, was enclosed by a strong wall with nine gates, portions of which still remain. There can also be traced the course of the great wall of Themistocles, built immediately after the Persian wars, 479 B.C., and the gate of Hadrian probably marks the limit of the extension to the E. made under the Emperor Hadrian. The modern city lies mainly to the N. and E. of the Acropolis, in the depression between it and Mt. Lycabettus. But the increase in pop. during the present century, owing to some extent to the arrival of refugees from Asia Minor, has led to the building of many suburbs, Mt. Lycabettus being now almost surrounded by buildings. A. has been almost entirely rebuilt since it became the cap. of the new kingdom of Greece at the withdrawal of the Turkish garrison in 1834, and is now a regular and attractive city, extending in the form of a semi-circle, and divided into six districts. It is connected with the older part by the two main thoroughfares of Hermes Street and Æolus Street, intersecting at Constitution Square the site of the royal palace, 1834–8. Numerous wide boulevards, the most important of which are Piræus Street, Athens Street, Stadium Street, and University Street, radiate from the central Place de la Concorde, and contain fine gov. and university buildings, and the offices of the many archæological and other societies for which A. is famous. There are two universities at A., the National and the Capodistria Univs. It is the see of a metropolitan, and possesses an ugly cathedral built in 1855. Before the capture of A. by the Turks, the Parthenon was the cathedral. The Theseum and Erechtheum were also converted into churches in the middle ages.

The antiquities of A. are probably unequalled in the world. The most famous is the Parthenon, dating from the reconstruction of A. after the Persian wars. It is of white marble, 228 ft. long and 100 ft. wide, ornamented by Phidias, and surrounded by forty-six Doric columns. Even in its ruins it is the most perfect specimen of Gk. architecture extant. To the N. of the Parthenon is the Erechtheum, which contained the statue and sacred olive of Athena, and had a wonderful portico of Caryatides. At the W. end of the Acropolis, just above the great gateway (the Propylæa) stands the Temple of Athena Nike, or Apteros Nike (Wingless Victory). At the foot of the hill to the N. is the Theseum, dating from the time of Pericles, and in excellent preservation and to the S. the Temple of Dionysus and the Odeon of Herodes Atticus. The Areopagus, or Mars' Hill, was the meeting-place of the great council of that name, and popular meetings were held on the mound of the Pynx, also near the Acropolis. Just outside the city to the S.E. are the ruins of the Temple of Olympian Zeus, begun by Pisistratus, and completed by Antiochus Epiphanes and under the Emperor Hadrian. The Stadium, on the banks of the Ilissus, was built by Lycurgus, 330 B.C., rebuilt by Herodus Atticus, A.D. 140, and after being largely destroyed in the middle ages, was restored in 1905. Thanks to the archæological societies which have made A. their head-

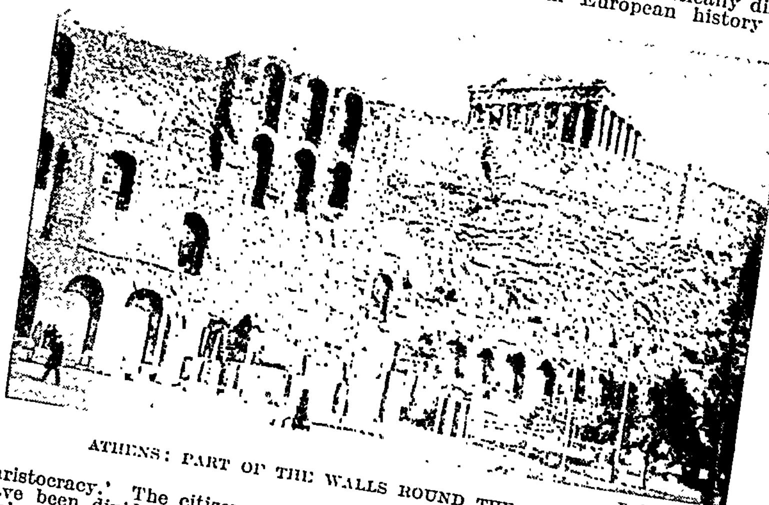


Red Star Line

PIRÆUS

quarters, the Acropolis has been entirely cleared of Turkish and mediæval remains, and many of the ancient buildings have been restored as nearly as possible to their former state. Excavations which have led to the discovery of innumerable examples of Attic art, are still being carried on.

The early history of A. is very obscure. It seems to have been originally one of numerous petty states, but early emerges as the cap. of Attica, traditionally united under Theseus. The earliest form of gov. was a monarchy, but the powers of the king were gradually limited by the nobles (Eupatridæ), and the rule of archons (*q.v.*) represents a period of



ATHENS: PART OF THE WALLS ROUND THE ACROPOLIS *Red Star Line*

ristocracy.' The citizens seem to ve been divided into four tribes, ch consisting of three brotherhoods. e growth of the democracy was dual, being assisted by the legisla- n of Draco, 621 B.C., Solon, 592 , and Clisthenes, c. 500 B.C. A. a leading part in repelling the ian invasion of 490 B.C., and in inal defeat of Xerxes, 480–79 B.C., after this, by the establishment e Delian League, became mis- of the whole of the Gk. states. golden age of Athenian power culture, 480–430 B.C., which ed its highest point under es, witnessed the production of est buildings, its most perfect re, by Phidias, and the poetic of Æschylus and Sophocles. sperity began to decline from of the Peloponnesian war, 403 en Sparta became the premier

state of Greece, and suffered further by the victories of Macedo culminating in the battle of Chæron 338. Its intellectual suprema however, long outlived its tempo power. In 146 B.C. A., together wi the rest of Greece, became part of t Rom. empire. Under Roman rule flourished, and became a great educa tional centre, declining, howeve with the spread of Christianity. A the fall of the empire it passed unde Byzantine rule, and early in th thirteenth century became the seat of a Frankish duchy. In the mid- fifteenth century A. was captured by the Turks, and practically disappeared from European history for centuries. Except for a brief period of Venetian rule, 1687–90, it remained in the hands of the Turks till its capture by the Gk. patriotic party in 1822. It was retaken by the Turks, 1826–7, but became cap. of the new kingdom in 1834. A. has become the centre of archæological research in Europe, the chief institutions being the Fr. School of Archæology, 1846; the Ger. Imperial Archæological Institute, 1874; the American School of Classical Studies, 1882; and the British School of Archæology, 1883. The pop. of ancient A. in its time of greatest prosperity was about 300,000; in the sixteenth century it is said to have fallen to 12,000. In 1928 it was about 452,920. Recent public works of importance include the A.-Piræus electric light and power scheme and the A.-Piræus water supply scheme. As to the

former, the Gk. Gov. concluded a contract in 1925 with an Anglo-Hellenic group for operation of power by various transport services in the A.-Piræus district. The question of an adequate water supply for A. had been discussed for some forty years, when, in 1926, the Gk. Gov. decided in favour of a scheme for a dam near Marathon to hold up the waters of the Charadros and Varnarva rivs.; and eventually a contract was given to an American company, the Ulen Water Company. The dam is nearly 300 yds. long and the reservoir, when completed, will hold over forty million cub. ft. of water. A tunnel over 13 m. long will lead the supply as far as Chelidonon, where the dam station is established. In the sphere of education, the A. Academy was inaugurated in 1920, during the régime of General Pangalos; the statutes of the Academy provide for instruction in letters and fine arts, moral and political sciences, and positive sciences. Recently the A.-Piraeus railways were taken over by the Hellenic Electric Railway Company, together with the tramways to the Piræus quays, which have now been extended to Perama. Some quarters of A. have become considerably extended since 1922 owing to the large immigration of refugees from Asia Minor following the Gk. *débâcle* in the War against Turkey, 1921–22. The quarter especially affected is the Patesia dist. and also the environs of A., particularly Kephesia.

Athens: (1) Cap. of Clarke co., Georgia, U.S.A., 92 m. N.W. of Augusta. It is the seat of the University of Georgia, and an important cotton-market. Pop. 18,192. (2) Cap. of Athens co., Ohio, U.S.A., on Hocking R., 40 m. S.W. of Marietta. The seat of Ohio University and of a state asylum. Pop. 7252.

Atherfield Clay, beds of clay, forming in some parts the lowest strata of the Lower Greensand beds, and resting upon the Wealden clay. It is exposed at Atherfield, in the Isle of Wight. The average thickness is 60 ft., and the deposit contains numerous crustacean fossils.

Atheroma (Gk. ἀθήρα, boil), a disease of the aorta and other large arteries, commonest in old people, or a tumour filled with sebaceous matter. In the former instance there is a degeneration of the innermost lining of the vessel, frequently followed by calcification, softening, or ulceration. The disease often affects the brain.

Atherstone, tn. of Warwickshire, England, 7 m. S.E. of Tamworth. The prin. industry is hat-making. Close by are the ruins of the Cistercian abbey of Merevale, founded 1149. The tn. stands on the Rom. Watling Street. Pop. 5957.

Atherstone, Edwin, Eng. poet (1788–1821), a friend of the painter Martin, whose works influenced his poetry. His chief publications were *Abradates and Panthea, Last Days of Herculaneum, Fall of Nineveh, Sea-Kings in England, Israel in Egypt*, and *The Handwriting on the Wall*.

Atherton, a tn. of Lancashire, England, 13 m. N.W. of Manchester. Contains large cotton factories, ironworks, and collieries. There were formerly many silk-weaving mills. The nonconformist chapel is famous for its minister, 'General' James Wood, who raised a troop against the Pretender, 1715. Pop. 19,856.

Atherton, Charles Gordon (1804–53), American politician, *b.* at Amherst, New Hampshire; graduated at Harvard, 1822. After serving in the state legislature and as speaker of the Lower House, he was elected to Congress, 1837. In 1838 he introduced the famous resolution, 'That all petitions relating to slavery, or its abolition, be laid on the table without debate,' which was passed by 120 to 78. He was elected to the Senate in 1843 and in 1852.

Atherton, Gertrude Franklin (maiden name Horn), American novelist, grand-niece of Benj. Franklin, *b.* at San Francisco, 1857; settled in London, 1895. Her novels frequently deal with California as it was at different times, in the nineteenth century especially, and include *The Doomswoman*, 1892; *Patience Sparharok and her Times*, 1897; *A Whirl Asunder*, 1895; *The Californians*, 1898; *Senator North*, 1900; *The Aristocrats*, 1901; *The Conqueror* (life-story of Alexander Hamilton), 1902; *The Splendid Idle Forties*, 1902; *Rulers of Kings*, 1904; *The Bell in the Fog*, 1905; *The Travelling Thirds*, 1905; *Rezanov*, 1906; *Ancestors*, 1907; *The Gorgeous Isle*, 1908; *Tower of Ivory*, 1910; *California—an Intimate History*, 1914; *Mrs. Balfame*, 1916; *The Living Present*, 1917; *Sleeping Fires*, 1922; *The Immortal Marriage*, 1927; *Dido: Queen of Hearts*, 1929.

Athias, Joseph, a famous printer at Amsterdam, who died in 1700. With the help of the most distinguished scholars at Amsterdam, he compared the old editions and manuscripts of the Hebrew Bible, and pub. a new ed. in 1661, the summaries and preface of which were written by John Leusden. A second ed. was pub. in 1667, with many corrections. These eds. of the Bible were more correct than any former eds.; but still they contained errors in the vowel points and

accents. A. also printed the Bible in Spanish, Jewish, Ger., and English.

Athletics in the form of public games have been part of the life of nations from the earliest day. The Gks. were among the first promoters of these festivals and the most celebrated; but they took the games from the Peloponnesians; though the origin of the famous Olympic Games reaches back into remote antiquity prior to the commencement of the historical era in Greece, and by the Gks. themselves was attributed to a divine source. *See* OLYMPIA.

The Roman Games were held at the festivals of the gods, but the Gk. ideal became degraded by professionalism. The combats of gladiators were the occasion of national festivals, and [illegible] beasts were very [illegible] said to have set [illegible]o slay eighteen [illegible]ook five days to accomplish. Chariot races were the sport of the nobility, and the highest in the land took part. The great amphitheatre at Rome was supposed by Aurelius Victor to have seated 385,000 people. The chief games of the Roms. were the Apollinarian, the Circensian, and the Capitoline.

Public games in the Middle Ages took the form of tournaments (*q.v.*), but archery and wrestling were the sport of the people, as the lists were the pastime of the nobility. Henry VIII, however, did not disdain to excel at hammer-throwing or 'casting the barre,' but under Edward III weight-putting was forbidden as interfering with archery. Later under Charles II professional races for wagers began to be popular, and this aroused amateur enthusiasm, leading to the renaissance of amateur athletics in the nineteenth century. In 1850 a movement was started to organise sports meetings at the colleges of the Universities of Oxford and Cambridge. As a result of this, the first inter-university contest took place in 1864, each side winning four of the eight events. Meanwhile the London Athletic Club and others had been formed, and finally in 1880 the need for a central authority gave rise to the Amateur Athletic Association. Since then, the A.A.A. has organised a yearly championship, now held in London.

As regards modern A., we must confine ourselves under this head to the field and track sports. Cricket, football, etc. will be found dealt with under their various heads. Modern A. may be said to have begun with the revival of the Olympic Games, celebrated at Athens in 1896 as the result of the activities and the enthusiasm of the Baron Pierre de Coubertin. One ideal of his was to promote through sport an international [illegible] Great War hav[illegible] quadrennial suc[illegible] it was only in [illegible] of 1928 that Coubertin's idea had begun to be realised.

The Eighth Olympiad at Paris in 1924 was remarkable for the performances of Paavo Nurmi, the great Finnish runner. He holds, among the world's records, those for the 5000 metres with 14 min. 28⅕ sec. and for the 1 m. with 4 min. 10⅖ sec. The 3, 4 and 5 m. records are also his, but, although he has applied for a 10 m. record of 50 min. 15 sec., A. Shrubb's famous times still hold officially for the 6 to 10 m. distances. In 1926 O. Peltzer, Germany, beat Nurmi over the 1500 metres and set up a world's record for that event of 3 min. 51 sec. Peltzer also holds the half-mile record of 1 min. 51⅗ sec., and D. G. A. Lowe gained for England the Olympic record for 800 metres with 1 min. 51⅘ sec. America holds the records for the shorter distances from 440 down to 100 yds., the former being run in 47⅖ sec. by J. E. Meredith in 1916. E. J. Thomson, Canada, is the champion hurdler for 120 yds. with 14⅗ sec., while the 440 yds. hurdles is held by J. A. Gibson, U.S.A., with 52⅗ sec. Lord Burghley won for England the 400 metres hurdles at Amsterdam, returning 53⅖ sec., an Olympic record. The field events are gradually returning to favour, although jumping has generally been popular. This latter includes high jump, long jump and pole vault, at all of which America excels. H. M. Osborne having cleared 6 ft. 8¼ in., E. B. Hamm 25 ft. 11⅛ in., and S. Carr 14 ft. 1 in. at their respective jumps. Throwing the hammer, which event goes back to the ancient Tailtean Games of Ireland, is performed with a hammer of 16 lb. wt., attached by a steel wire to a triangular handle, the whole length not exceeding 4 ft. In 1913 R. Ryan, U.S.A., made the record throw of 189 ft. 6½ in. Putting the weight, an iron shot weighing 16 lb. is a usual event at meetings; the holder of the record is J. Kuck, U.S.A., with a put of 52 ft. 0¾ in.

At the Ninth Olympiad (Amsterdam, 1928) America won five of the field events, one of which was the discus-throw by C. Houser, holder of the world's record of 158 ft. 1⅝ in. The discus weighs about 4½ lb., is made of wood and is 8⅝ in. in diameter, with brass plates let into the centre. There are two methods of throwing, the Free Style and the

Greek Style; the latter is represented by the statue of the Discobolus.

The tug-of-war has long been a popular contest, and one in which the City of London Police are very proficient. Walking has not been so popular of recent years, as it was a century ago in the time of the famous Capt. Barclay. It is, however, to be included in the Tenth Olympiad, to be held at Los Angeles in 1932. The record for a 1 m. walk is 6 min. 25⅘ sec., made in 1910 by G. H. Goulding, Canada, who also holds the 7 m. record. The record for the 100 m. walk is held by T. E. Hammond who walked the distance in 18 hr. 4 min. 10¼ sec. in 1908. Another method of making records is that of doing the event against time. That for an hour's run is held by A. Shrubb, who covered 11 m. 1137 yds., and G. E. Larner walked 8 m. 438 yds. in the same time.

Paper-chases were the origin of cross-country running, but are nowadays rather falling out of public favour, though cross-country races still retain their popularity. The sport is governed by the National Cross-country Union, and the season lasts from September to March. In 1912 a cross-country race was included in the Olympic Games, and in 1920 and 1924 this event was won by Nurmi. In 1928, however, it was omitted as unsuitable for a summer programme.

The Ninth Olympiad will be remembered as being the first to include events for women athletes. These were the 100 and 800 metres flat race (the latter won in record time, [2] min. 16⅘ sec. by L. Radke, Ger[many]), the 400 metres relay race, the [h]igh jump, and discus-throw. Great [B]ritain did not compete, owing to the [a]dverse decision of the Women's [A]mateur Athletic Association. The [W].A.A.A. was founded in 1922, one [ye]ar after France had given the lead [to] women's A. by forming the [Fé]dération Sportive Féminine Inter[nat]ionale. Under the auspices of the [F.S.]F.I. the first women's Olympic [Ga]mes were held at Paris in 1924. [...] records that still hold were set [b]y Mejzilokovato for 50 metres in [...s]ec., 60 metres in 7⅗ sec., and 80 [metr]es in 10 sec. The last two, how[ever], have since been equalled by [...]deau, who also holds the 100 yds. [recor]d of 11⅕ sec. Other records are [2]20 yds. in 25⅞ sec. by E. W. [...]rds, the 440 yds. in 59⅕ sec. by [...] King, and the 1000 metres in [...] 8⅕ sec. The second Women's [...]iad was held at Gothenburg, [...], when Great Britain was suc[cessful]. Women's events are to be included in the Olympic Games, to be held at Los Angeles in [...]. The 800 metres flat race, howe[ver, is] to be omitted in favour of [...] metres hurdle race, and one [...] event, the javelin-throw, is to [be in]cluded. The present records [for] these last two events are 12⅘ sec. [for] the hurdles, won by H. Hatt, [and] 122 ft. 10 in. for the javelin, wo[n by] Hargus. The record for throw[ing] the discus, weighing 1 kg., is 12[...] 11 in. won by Konopacka.

Women's A. are now a recogni[sed] institution, having survived mu[ch] criticism. Men's performances ha[ve] recently so much improved th[at] those of women have suffered [by] comparison. But if record-breakin[g] is not the object of sport, any critic[ism] on these lines is misconceived. For a discussion on this subject se[e] *Athletics* by Lowe and Porritt. *Athletics of To-Day* by F. A. M[...] Webster is also a comprehensive survey.

Athlone, a tn. on borders of Westmeath and Roscommon, Ireland, on R. Shannon, 80 m. W. of Dublin. There are manufs. of felts, friezes, and linens. A canal, a mile long, enables steamers to avoid the riv. rapids at this point. The Shannon is crossed by a fine bow-string and lattice iron bridge. The castle was founded in John's reign, and besieged by William III. in 1688, being finally taken by General Ginkell. The tn. is strongly fortified and has barracks for 15,000 men. Pop. 7472.

Athlone, Godart Ginkell, Earl of, Dutch general (1630–1703), accompanied Prince of Orange to England, 1688; fought in battle of Boyne, 1690, and was made commander-in-chief in Ireland, 1691, when he took Athlone and defeated the Irish. Received his title, 1692. Commanded Dutch in Flanders, 1695–6, and Dutch troops under Marlborough, 1702.

Athni, a tn. in Belgaum dist., Bombay, India, 44 m. S.W. of Bijapur. There are manufs. of cotton, cloth, blankets, and saltpetre. Pop. 11,000.

Athol, a tn. of Worcester co., Mass., U.S.A., on Miller's R., 82 m. N.W. of Boston. It has manufs. of boots, cloth and silk, furniture and tools, and has a public library. Pop. 9792.

Athole, a dist. in the N. of Perthshire, Scotland, on the southern slopes of the Grampians. The head of the Murray family is Duke of Athole.

Atholstan, Sir Hugh Graham, 1st Baron, of Atholstan, Quebec; *b.* July 18, 1848 (son of Robt. Walker Graham), knighted 1908; ennobled 1917. Owner of *Montreal Star* and other Canadian newspapers.

Athor, or Hathor, Queen of Heaven, an Egyptian goddess, daughter of Ra; the female counterpart of Osiris, and

with a close affinity to Isis. She was symbolised by a cow, and worshipped throughout Egypt under many local forms and names.

Athos, a mt. of Turkey, at the extremity of the most eastern of the three tongues of the Chalcidice Peninsula, on the Ægean Sea. It is about 6350 ft. in height. The name is also applied to the whole tongue of land, which is connected with the mainland by an isthmus just over a mile broad. The peninsula is about 30 m. long and 3–6 m. wide. There are still traces of a canal cut through the isthmus by Xerxes to avoid the dangerous promontory. Since the middle ages Mt. A. has been the seat of a monastic republic. It was a mediæval centre of Greek theology and learning, and the remains of magnificent libraries still exist. There are now twenty Gk. monasteries and numerous chapels and hermitages on the peninsula, with a pop. of about 6000 monks.

Athy, a tn. of Kildare, Ireland, at the junction of R. Barrow and Grand Canal, 40 m. S.W. of Dublin. There are manufs. of bricks and tiles. It was the site of a great Irish tribal battle in the third century. The tn. grew up round the monasteries of the Crutched and Dominican friars, and was plundered by the Scots in 1315 after the battle of Ardscull. Pop. (1911) 3535.

Atitlan, lake of Guatemala, Central America. It is 4700 ft. above sea-level, 24 m. long and 10 m. wide, with a circumference of 64 m., surrounded by mts., very deep, and with no visible outlet.

Atkarsk, a tn. of Saratov, Russia, on R. Atkara. Has a trade in grain. Settled in fourteenth century. Pop. 12,600.

Atkins, Tommy, slang term for the British private soldier. Its origin is similar to the use of 'M. or N.' by the church, or 'John Doe and Richard Roe' by lawyers, as it was the name selected by the War Office to fill in the specimen form of a manual distributed throughout the army, in which were to be entered details concerning each man.

Atkinson, Edward (1827–1905), an American economist, *b.* at Brookline, Massachusetts. President of Boston Manufs. Mutual Fire Insurance, 1877. He wrote a great deal on all economic questions, and in 1887 was appointed commissioner to inquire into the state of bimetallism in Europe. He also invented the Aladdin cooking oven.

Atkinson, George Francis (1854–1918), Ame[illegible] cator, *b.* at [illegible] educated at [illegible] and Cornell [illegible] Biology at [illegible] stitute and Agricultural and Mechanical College, 1889. Professor of Botany at Cornell, 1892. Among his works are well-known text-books of botany and *The Biology of Ferns*.

Atkinson, Sir Harry (1831–92), a politician. In 1855 went to New Zealand, where he soon distinguished himself. He became captain in the Waitara war, 1860–64, and minister of defence in the cabinet of Sir Frederick Aloysius Weld, 1864–5. He was three times prime minister of New Zealand, and four times colonial treasurer.

Atkinson, James (1780–1852), Persian scholar. Held many medical, gov., and literary appointments in India. Published numerous Persian translations, and several travel books and original poems, mainly on eastern subjects.

Atkinson, John (1835–97), American Methodist Episcopal preacher, *b.* at Deerfield, New York. He wrote the well-known hymn 'We shall meet beyond the river,' and historical works on Methodism.

Atkinson, John Augustus (*b.* 1775, date of death unknown), painter. Went to St. Petersburg, 1784; patronised by Empress Catherine and Emperor Paul. Several of his aquatint engravings and water-colours are at the British Museum and South Kensington.

Atkinson, John Christopher (1814–1900), author and antiquary. Ordained, 1841; became vicar of Danby, Yorkshire, 1847. Published many philological and topographical works, the most famous being *Forty Years in a Moorland Parish*, 1891.

Atkinson, T. W. (1799–1861), Eng. artist and traveller. His paintings are mainly landscapes. Spent seven years exploring in Siberia; published *Oriental and Western Siberia*, 1858, and *Travels in the Regions of the Upper and Lower Amoor*, 1860.

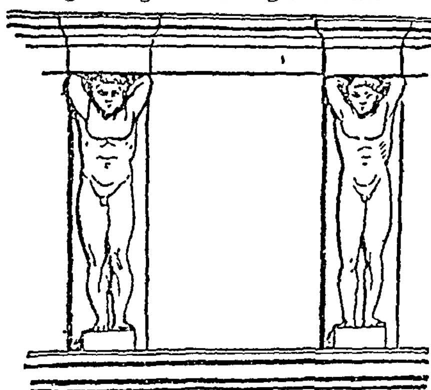
Atkyns, Sir Edward: (1) (1587–1669) Baron of the exchequer, 1645–48. Usually acted with the Commonwealth. (2) (1630–98) Son of (1) baron of exchequer, 1679–88. Refused to take oath of allegiance to William III.

Atkyns, Richard (1615–77), typographical writer. Famous for his broadside *The Origin and Growth of Printing*, 1664, in which he tried to estab. that printing was a crown monopoly, and endeavoured to secure the office of patentee for himself.

Atkyns, Sir Robert (1621–1709), English judge, son of Sir Edward A. (1) and elder brother of Sir Edward A. (2), whom he succeeded as chief baron of the exchequer after the Revolution. Assisted in defence of Lord William Russell, 1683. Speaker of the House of Lords, 1689–93.

Atlanta, cap. city of Georgia, U.S.A., and co. seat of Fulton county in the N.W. part of the state. It is the seat of Clark and Atlanta universities. While it has considerably developed as an important manufacturing city, it is even more important as the distributing centre for the S. Many of the great industries of the N. have depots here, and it is also a kind of insurance capital for the S. As a consequence, it is a city of sky-scraper office buildings. Settled in 1840, it was besieged and captured by the Union troops under General Sherman in the American Civil War and the business section was destroyed. In recent years it has been one of the most rapidly growing cities in the S. Its pop. in the 1930 census was 270,367, but with the near-lying towns, which are really its suburbs, Greater Atlanta has a total pop. of 360,692.

Atlantes, an architectural term designating male figures used as



ATLANTES

columns to support cornices, architraves, etc.

Atlantic. A city and co. seat of Cass co., Iowa, U.S.A. Manufs. canned corn, drugs, bricks, and umbrellas. Pop. 4560.

Atlantic City, co. seat of A. co., New Jersey, U.S.A. Most celebrated seaside resort in the U.S.A., it is situated on an is. 60 m. S.E. of Philadelphia. Its close proximity to this city and to New York and its splendid railroad connections with the rest of the U.S.A. assure it an enormous all-the-year-round patronage. It has one of the finest bathing beaches in the world. It boasts the longest board-walk on earth. This walk, which is a very extensive promenade, is faced on one side by the sea and on the other by many magnificent sea-side hotels, some of which are of sky-scraper size. Pop. 65,748.

Atlantic Flights. During the decade after the Great War repeated attempts to cross the Atlantic by aeroplane were made. Several flights were successful, but the majority ended in the loss of the aviators. Flying a Sopwith-Rolls-Royce plane, Harry C. Hawker, pilot, and Commander Mackenzie Grieve, R.N., navigator, started from St. John's, Newfoundland, on the evening of May 18, 1919, the proposed route being to a point on the Galway coast, a distance of 1880 miles. To improve his chances, Hawker, just before reaching the sea, dropped the under-carriage of his machine, including the wheels, to lighten the load. No news reached England of the progress of this flight for a week, and it was assumed that it had ended fatally. But on May 19 a cable ship sighted the machine's red light in 50° 28′ N. Lat., 30° 2′ W. Long., some 150 m. north of the main steamer routes and 900 m. out of the direct course between St. John's and Galway. On May 25 a Danish steamer, *Mary*, reported that she had picked up the crew of the machine, who had been in the water for about 90 mins. before rescue. The plane was then in Lat. 50° 20′ N. Long. 29° 30′ W., 1100 m. from Newfoundland and 750 from Ireland, the engine having failed through mechanical defect. Simultaneously with this attempt, three American seaplanes *N.C.* 3, *N.C.* 4 and *N.C.* 1, started from Trepassey Bay, Newfoundland, on May 15 at 11 p.m., the proposed route being via the Azores to Lisbon and thence to England, a distance of 3368 m. The only machine to complete the distance was *N.C.* 4, piloted by Lieut.-Commander Read, U.S. Navy, who reached the Azores at 2.25 p.m., May 16, but remained some time there, only reaching Plymouth on May 31. The third attempt, which proved entirely successful was begun June 14 at 4.28 p.m. by Captain John Alcock, pilot, and Lieut. Whitten Brown, navigator, in a Vickers-Vimy machine, and the journey from St. John's to Clifton, Galway, about 1880 m., was accomplished in 16 hrs. 12 mins., the plane landing in a bog at 8.40 a.m., June 15. The mean speed was somewhat over 120 m. an hour, and for the greater part of the distance the plane was at an altitude of 4000 ft. Practically the whole time the aviators were either in a fog or flying between banks of fog, so that readings of his position by Lieut. Brown were rarely possible. Frequently the men found themselves flying upside down—not an uncommon experience.

Other competitors were forthcom-

ing for the prize of £10,000 offered by the *Daily Mail* for a trans-Atlantic flight, but mishaps or bad weather prevented them from starting. The flight of the American seaplanes which was organised by the U.S. navy administration did not come within the conditions of the newspaper prize competition, which eventually went to Captain—later Sir John—Alcock; but the flight of the American seaplanes was organised with much precision and was most useful as pioneer work. No other attempts were made to cross until the year 1927, when, on May 20, Captain (now Colonel) Charles Lindbergh, an American air-mail pilot left Long Island alone at 12.31 p.m. in his monoplane *Spirit of St. Louis*, and landed at Le Bourget aerodrome near Paris at 10.22 p.m., May 21, having crossed in a little over 33 hrs., covering about 3000 m. Just prior to this success Captain Guynemer, the French aviator, with a fellow-countryman, Captain Coli, attempted the flight from East to West in a Levasseur biplane, but no trace was afterwards found of them. In June 1927, two other Americans, Mr. Chamberlin, an airman, and Mr. Levine, left New York in a Wright monoplane of 200 h.p. and crossing the ocean alighted at Eisleben, Germany, a distance of about 3900 m. in just over 42 hrs. These successes acted as a spur to many subsequent aspirants, but it is evident that insufficient regard was paid to the vagaries of wind and weather for many perished. In the late summer of 1927 Col. B. Minchin, Capt. L. Hamilton, and Princess Lowenstein-Wertheim tried to cross from East to West, but were lost. Commander (now Rear-Admiral) Byrd (*q.v.*), with four passengers, flew from New York to Ver-sur-Mer, France, June 29–July 1, 1927, a distance of 3744 m., in 46 hrs. 6 min., coming down safely near the coast after flying many hours over France in a fog. So far (1930) two successful flights from East to West have been accomplished. Wing-Commander Kingsford Smith, with companions, crossed from Portmarnock, Dublin, to Newfoundland in June, and in September Capt. Coste and M. Bellonte [illegible] to New York. T[illegible] Messrs. Schlee [illegible] from Harbour Grace, Newfoundland, to Croydon (2500 miles) in 23 hrs. 19 min., and Capt. Boyd and Mr. Harry Connor crossed from Newfoundland to the Scilly Isles on Oct. 9–10, 1930, in 24 hrs. The death or narrow escape of yet other American or British citizens, who have tried to emulate these feats of mingled skill, endurance and luck, indicate that even the journey from West to East is as yet too hazardous for the aeroplane in its present state of development. Other attempts in 1928 and 1929 were: March 26, 1928, two Spanish aviators landed at Bahia having crossed South Atlantic from Seville; French monoplane *Yellow Bird* containing three Frenchmen and a stowaway, left Maine, U.S.A., June 13, 1929, and landed at Santander, Spain, the next day; on July 8, two American citizens, Roger Williams and Lewis Yancy, also crossed from Maine to Santander, their fuel being exhausted before they could reach a further point; on October 22, Diteman, a Montana pilot, attempted a monoplane flight to Europe from Harbour Grace and was lost.

Atlantic Monthly, an American review, founded at Boston in 1857. Its contents were somewhat similar to, though rather more purely literary than, those of its famous and older rival t[illegible] *Review.* James [illegible] time was editor, [illegible] directed by Wil[illegible] 1865–81, while among the most famous contributors have been Longfellow, Oliver Wendell Holmes, and Whittier. The present editor is Mr. Ellery Sedgwick. The address is 8, Arlington St., Boston.

Atlantic Ocean, one of the five great hydrographical divs. of the world, named after either Mt. Atlas or the mythical Atlantis, and, lying as it does between Europe and Africa on the E. and N. and S. America on the W., dividing the Old and New Worlds. It stretches from about 70° N. to 40° S., from the Arctic to the Antarctic Oceans respectively, and is usually taken as being divided by the equator into the N. A., with an area of about 14,000,000 sq. m., and the S. A., with an area of about 10,100,000 sq. m. The breadth varies from 4500 m. between the Saharan coast and Florida, to 16,000 m. between the Guinea coast and Brazil. It communicates with the Baltic and Medi[illegible] the smaller [illegible]rt of it are [illegible]h Sea, the [illegible] Biscay, the [illegible] of Mexico, and the Gulf of St. Lawrence. Continental islands [illegible] the British Isl[illegible] [illegible]nds; among [illegible]anic islands [illegible] St. Paul's [illegible] da Cunha, [illegible] the Bermudas, the Canaries, the Cape Verdes, Madeira, Fernando Noronha, Trinidad, and St. Helena. The A. receives the drainage

of almost all W. Europe, most of Africa, N. America E. of the Rockies, and S. America E. of the Andes, the chief riv. systems flowing into it being those of the Rhine, Loire, Tagus, Senegal, Niger, Congo, St. Lawrence, Mississippi, Orinoco, Amazon, and La Plata.

The average depth of the A. is 2200 fathoms (2–3 m.), the bed being usually a gently undulating plain. A low submarine ridge, over which the average depth is 17,000 fathoms, runs approximately down the centre from N. to S. There is a considerable E. to W. extension of this ridge between Ireland and Newfoundland, along which the chief cables have been laid, and on both sides of the main elevation are to be found the greatest depths, often between 3000 and 4000 fathoms, while the Nares Deep, N. of the Virgin Is., reaches 4561 fathoms. There are several large sandbanks rising to within a few fathoms of the surface, the chief of these being the Newfoundland, the Dogger, and the Agulhas Banks. The continental shelf all round the A. is narrow and falls away in a steep slope. The surface temp. varies from about 85° F. at the equator to 40° F. in the N. and S. temperate regions, and the bottom water temp. averages about 35° F. The water is saltest (density over 1·0275) in the trade-wind regions, and least in the belt of equatorial calms, always increasing in salinity below the surface.

The trade winds, which determine the course of the ocean currents, take their rise in high-pressure areas in the middle of both N. and S. As. The S.E. and N.E. trades produce the warm equatorial current, which divides at Cape St. Roque and flows S. as the Brazil current and N. through the Caribbean Sea and Gulf of Mexico, emerging as the Gulf Stream, which has an enormous influence on the climate of N.W. Europe. A cold current flows S. from the Arctic Ocean, and, as the Labrador current, passes beneath the Gulf Stream off the Newfoundland Banks. The N.A. current leaves a patch of central calm, between 40° and 75° W. and 20° to 35° N., which is occupied by the Sargasso Sea, in which are enormous floating banks of gulf-weed. The surface waters teem with animal and vegetable life, which decreases in mid-ocean and at great depths. It is rich in edible fish, and herring and cod fishing form important industries on both the American and European shores of the North Atlantic.

The A. is the great commercial highway of the world, its shores being inhabited by the most civilised nations in existence. The chief danger to navigation is the presence of floating ice, which is carried N. from the Antarctic to 38° S., and S. from the Arctic to 40° N., thus interfering with the great steamship route between England and N. America. This crossing can now be made in five days, indicating the enormous progress in navigation since 1620, when the *Mayflower* took 106 days for the journey. There are now numerous trans-A. submarine cables and others along the shores connecting important ports, while wireless telegraphic stations are working in Cornwall and Nova Scotia. See *Reports on the Scientific Results of the Voyage of H.M.S. 'Challenger,'* ed. by Sir Wyville Thomson and Dr. John Murray, 1880–9 (37 vols.), and *Results of a Deep-Sea Sounding Expedition in the North Atlantic during the Summer of* 1899 (Royal Geographical Society: *Supplementary Papers*, 1910).

Atlantic Shipping Trust, or 'Morgan Combine,' a popular expression for the International Mercantile Marine Company, organised in 1902 by Mr. S. Pierpont Morgan, to control the chief British and American N. Atlantic steamship companies. In Feb. 1902 provisional agreements were entered into for the acquisition before the end of the year of the White Star Line, the Dominion Line, and the Leyland Line (British), and the American Line and Atlantic Transport Line (American), by a corporation of which the total capital stock amounted to £120,000,000, £60,000,000 being 6 per cent. preferred stock and £60,000,000 common stock. By this agreement British ships were to sail with British registers and have British officers and crews, while further British vessels of the combine should only be built by Messrs. Harland and Wolff of Belfast. Working arrangements were also made with Ger. lines. The combination was incorporated at Trenton, New Jersey, in Oct. 1902. A British committee, subordinate to the general board, was appointed, and Mr. C. A. Griscom, of the American Line, became general manager, being succeeded in 1904 by Mr. Bruce Ismay, of the White Star Line. The British gov. also entered into agreements with Mr. Morgan by which it was secured that British companies in the combination should remain British, that they should be kept alive, and that the majority of their directors should always be British subjects; also, that every British ship in the combination should remain British, being officered and mainly manned by British subjects, and that half of the ships hereafter to be built for the combination should be British under the same conditions.

Such British vessels were to remain on an absolute equality as regards gov. services, with other British companies. The agreements were to hold good for twenty years, and were finally ratified in 1903. In 1927, during the great post-war 'slump' in shipping, the International Mercantile Marine Company decided to dispose of part of their holdings. The White Star Line and the Shaw, Savill & Albion Company, together with the Aberdeen Line, were sold to the great British combine headed by Lord Kylsant. In recent years the I.M.M. Company has become more American in character.

Atlantic Telegraph (*see* TELEGRAPHY). The idea of a trans-Atlantic cable was first mooted by Morse in 1843. A company, formed 1856, laid a cable in 1858, which soon broke down. Another, laid in 1865, broke, and the first real success was made in 1866.

Atlantic Transport Company, running between London, Philadelphia, and New York, and mainly carrying refrigerated meat and live stock. The present company, formed in 1889 on the basis of a company previously incorporated in 1886, now includes the ships of the National Steamship Company, the Wilson Line, and the Furness-Leyland Line. The vessels of the company fly the British flag, but the combine was largely financed by the United States. The two finest vessels of this company are the *Minnetonka* and the *Minnewaska*, each of about 22,000 tons gross. These sister ships were built, respectively, in 1924 and 1923. Their length is 600ft. and they have a speed of 16½ knots. Their funnels are red with black top, and they are fitted to burn liquid fuel.

Atlantis, an anct. mythical is., supposed to lie in the Atlantic, W. of the Straits of Gibraltar. It is described by Plato in the *Timæus* and the *Critias*, where it is stated that Solon was told of its existence by an Egyptian priest. Plato represents it as having been engulfed in the sea ...) years previously as a punishment for the impiety shown by the ...). in waging war against Athens. ...oal of mud still marked its site. ...s been variously identified with ...anaries, America, and Scandinavia, but is probably only a Gk. ... of the Celtic 'Island of the ... always placed in the Western ...

...atosaurus (Gk. Ἄτλας, σαῦρος, ... a fossil genus of reptiles con... the most gigantic of animals ...own to exist, being estimated ...t. in length. This Dinosaur ...ivorous and four-footed, the ...long and head minute. Remains are found in the Jurassic st... of N. America.

Atlas, in Gk. mythology, one of ... Titans, son of Iapetus and Clyme... He led the Titans against the go... and was therefore condemned ... stand near the Hesperides and be... the heavens on his shoulders. Accor... ing to another legend, he was turn... into Mt. Atlas by Perseus with th... Gorgon's head. The term is als... applied to the highest vertebra of th... spinal column, and to a collection o... maps, having been first used in this latter sense by Mercator in the sixteenth century.

Atlas Mountains, a great mt. system of N.W. Africa, stretching N.E. from Cape Nun in Morocco to Cape Bon in Tunis. For the most part there is no continuous chain, but an irregular mass of mountainous land, including vast plateaus and highlands. They may be roughly divided into (1) the Moroccan Atlas, and (2) the Tunisian and Algerian Atlas, both containing numerous minor divs. In (1) there are four main chains: (*a*) the Great Atlas, containing the peaks of Tizi Likumpt (13,151 ft.), Tizi Tamjurt (14,500 ft.), and Miltsin (11,430 ft.); (*b*) the Middle Atlas, to the N. of (*a*); (*c*) the Anti-Atlas, connecting with (*a*) near the peak of Sebel Ayashin (12,000–14,000 ft.); (*d*) the Jebel Bane, to the S. of (*c*). In (2) there are two main ranges; (*a*) the Great Atlas, containing the peak of Sheliya (7635 ft.), and (*b*) the Little Atlas, containing the peak of Lella Khedija, the two being separated by a plateau. The A. Mts. are non-volcanic, and only very few summits are perpetually covered with snow. The valleys are very fertile, and the lower slopes covered with forest. The dist. is difficult of penetration, except in Algeria, where there are some excellent military roads. The geological formation of the mts. is crystalline rocks and schist, with flanking of limestone. The mineral wealth is as yet practically unworked.

Atlixco, a tn. of Mexico, 16 m. S.W. of Pueblo, situated at an altitude of 5460 ft. in a fine fruit-growing dist. Pop. 9720

Atmolysis, a method of separating gases of different densities by passing them through a porous tube or diaphragm. Let a tobacco-pipe stem be cemented into an outer glass tube so that its ends project, and let the outer tube be exhausted by an air-pump. If a slow current of air be passed through the pipe, the nitrogen diffuses through the porous clay quicker than the heavier oxygen, so that the air emerging is richer in oxygen than ordinary air. By repeating the process with the same gas a number of

times, a fairly pure supply of oxygen is obtained.

Atmometer, an instrument used to determine the amount of water passing into the air by evaporation. It consists of a hollow ball of unglazed clay fitted with a narrow glass tube. The instrument is filled with water and inverted with the glass tube dipping into a mercury bath. As the water percolates through the porous clay and is evaporated into the atmosphere, the mercury rises in the glass tube, and the level of the mercury gives a rough indication of the humidity of the atmosphere.

Atmosphere, the gaseous covering or envelope of the earth or any other planet, extended to mean the somewhat indefinable influence surrounding a person or thing. The earth's A. is the remainder of the collection of gaseous matter, part of which has cooled down to form the earth and sea. The gaseous constituents still unliquefied are a mixture of gases comprising about 21 per cent. of oxygen, 78 per cent. of nitrogen, 1 per cent. of argon and other gases, and a slight trace of carbon dioxide. If the air is moist, it contains aqueous vapour to a limit of about 3 per cent. Other ingredients are found in particular localities; gaseous compounds of sulphur and nitrogen in tns., salt at the sea-side, and everywhere dust composed of inorganic particles, decaying organic matter, tiny seeds and pollen from plants and countless bacteria of all sorts.

The oxygen of the A. is breathed into the lungs of animals and enters the gills of fishes after absorption by the water, and it is constantly entering into combination with other substances by combustion or the slower processes of oxidation, as in rusting iron. The animals breathe out carbon dioxide, and combustion of carbon compounds sets free a great amount of the same gas, so that if there were no opposing influences at work, the air would quickly become too much vitiated to sustain life. All plants with green colouring matter, however, are able to absorb carbon dioxide, utilising the carbon to build up their tissues, and setting free most of the oxygen to preserve the balance in the A. Carbon dioxide is also more soluble in water than oxygen, so that any greater pressure of the former gas causes increased absorption by all water surfaces, thus tending to keep the proportions constant. Nitrogen serves as a diluent for oxygen in breathing, and is converted by lightning flashes, and to some extent by certain bacteria in the roots of leguminous plants, and in the soil, into compounds necessary for most forms of plant life. Argon is a remarkably inert gas, discovered in 1894, and is accompanied in the air by smaller quantities of similar gases, viz., helium, neon, krypton and xenon.

The height to which the A. extends is not absolutely known, but it exerts a pressure of about 14·7 lb. on every square inch of surface. Our bodies have an internal pressure which in ordinary circumstances exactly balances atmospheric pressure, and is therefore not felt by us. Similarly, fish that live in the ocean depths are adapted to sustain the correspondingly great pressure, so that if they are brought to the surface they explode. There are, however, certain variations of pressure caused by the variations of heat-expansion of the air and the consequent currents, whirlpools, and cyclones (*see* METEOROLOGY).

Atmospheric Railway, *see* RAILWAYS.

Atoll is the name of a type of coral islands consisting of low circular coral reefs, which form a ring of land around a central lagoon. Their origin was for long an enigma, as they rise abruptly from ocean floors of a depth far exceeding that at which the coral insect can live. They are found in the tropical Indian and Pacific Oceans. It was formerly thought that the As. were so shaped because they had grown upon the ruins of submerged volcanic craters; but their size and irregularity of shape, and the fact that no volcanic rocks were found in their neighbourhood, disproved this hypothesis. Darwin's explanation is now generally accepted. They are, according to him, due to the upgrowth of coral reefs over is. that have gradually subsided at a rate no greater than the upward building of the coral. Thus the A. began as a fringing reef, and then became a barrier reef as the land slowly subsided.

Atom and Atomic Theory. *Atom* (Gk. ἄτομος, indivisible) is the name given to the smallest particle into which matter can ultimately be divided. Among the ancients there were two theories as to the nature of matter, or substance. Some, such as Anaxagoras and Aristotle, held that matter was infinite and continuous, and that therefore any substance could theoretically be divided and subdivided to an infinite extent. Others, such as Epicurus and Democritus, taught that matter was *grained*, that is, consisted of minute particles which could not be divided. Both theories were based on naturally slender experimental evidence, and it may be said at once that the final settlement of the question is still to seek. On the one hand, such phenomena as the expansion and compres-

sion of all substances under certain conditions, such as changes of pressure and temp., seemed to render necessary a certain amount of space between particles; and on the other, there appeared to be some combining or continuous medium necessary, such as is provi
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The question ha
domains of chemistry and physics, and different conceptions of the nature of the smallest particles of matter have arisen to explain chemical and physical phenomena respectively. All that can be said at the present time is that certain hypotheses are at least useful in serving as bases for chemical and physical theory, and whether they are ultimately true is perhaps a question for the speculative philosopher. That the hypotheses of the chemist and physicist do not in all respects agree need not be held to invalidate the structure of knowledge reared upon them in their respective spheres; the history of scientific discovery has disclosed many examples of a relatively true system of facts built up on hypotheses which have since been found to be false—as long as they are consistent with each other, they will have their place in the ultimately perfect system.

Atomic Theory.—Towards the end of the eighteenth century the development of experimental chemistry led to a desire for greater quantitative exactness. The theory of 'phlogiston' had been held to explain many chemical changes. In combustion, for example, the burning body gave forth 'phlogiston,' which was regarded as an element and therefore as transferable from one body to another. The effect of weighing the products of combustion was, however, to show that weight was gained and not lost. About this time Priestley discovered oxygen, and a new light was thrown on the phenomena of combustion. The idea gradually prevailed that the combined weight of the substances concerned in chemical change was not altered at any stage of the process; that is, if all the substances are weighed before the action, and all the products collected and weighed, the two results will be found to be equal. This was known to be true with regard to simple actions where there is no change from gas to liquid or solid, or *vice versa*, and other experimental evidence caused the principle of the 'Conservation of Matter' to be extended to all cases. The value of this principle has been enormous, particularly in the direction of detecting new elements, and it was soon seen that the combined weights of the elements in the substances decomposed remained constant although the elements became otherwise combined.

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particles of a compound into 'As.' of the elements combined. Dalton enunciated the law of *constant proportions*, which states that when two elements unite to form a compound the weights that combine are in an invariable ratio, a ratio that is characteristic of that compound. When, for instance, oxygen and hydrogen combine to form water, as all oxygen As. are of the same weight, and the weight of hydrogen As. likewise constant, and as each molecule of the resulting water contains the same proportion of hydrogen and oxygen As., it follows that the weights of the quantities concerned will be proportional to the weights of the As. Dalton considered that a molecule of water consisted of one A. of hydrogen and one of oxygen. As it was necessary to have eight times as much oxygen by

an A. of hydrogen. Other reactions, however, modified this view. For example, marsh gas consists of carbon and hydrogen. From the constitution of carbon monoxide (CO) it was found that a weight of 6 units of carbon combined with 8 units of oxygen. On the assumption that the atomic weight of oxygen was 8, hydrogen as the lightest gas being 1, the atomic weight of carbon must be 6. In forming marsh gas 6 units of carbon combine with 2 units of hydrogen. This gives CH_2 as the formula for marsh gas. It was found, however, that a quarter of the hydrogen could be replaced by half an equivalent of chlorine, giving $CH_{1\frac{1}{2}}Cl_{\frac{1}{2}}$, which is absurd. This must therefore be read as C_2H_3Cl, which means that the formula for marsh gas must be revised to read C_2H_4. But if the atomic weight of carbon is 6 it always appears in organic reactions in even numbers; therefore the probability is that the atomic weight is 12. This necessitates again revising the marsh gas formula, which now reads CH_4. Therefore from the formula CO, the atomic weight of oxygen is 16. Besides, if oxygen were 8, other

formulæ would appear with O as an even number. Therefore, formula for water = H_2O.

The above is an example of the reasoning by which the relative proportions of the As., in molecules were arrived at, and each result helped to confirm or revise previous determinations. It was known that the same elements combined in different proportions to form different substances; carbon, for instance, forms two oxides CO and CO_2. The relations between such substances is expressed by the law of *multiple proportions*, which asserts that if two elements form more than one compound, then the weights of the one element which are found combined with unit weight of the other in the different compounds, must be in the ratio of two or more whole numbers.

Shortly after Dalton's atomic theory had been enunciated, Gay Lussac investigated the volumetric conditions of gases in combination, with the result that he discovered and pub. the law that when gases combine together they do so in volumes which bear a simple ratio to one another and to that of their product. In 1811 Avogadro pub. his hypothesis on the molecular constitution of gases, which asserts that under the same conditions of temp. and pressure equal volumes of all gases contain the same number of molecules whether those molecules consist of single As. or are composed of two or more As. of the same or different kinds. Both hypotheses were well supported by experimental evidence, and form in combination an interesting corollary to Dalton's atomic theory. It was found that two volumes of hydrogen united with one volume of oxygen at the same temp. and pressure to form two volumes of water vapour under the same conditions of temp. and pressure. From Avogadro's hypothesis it follows that there must be the same number of molecules of water vapour as there were of hydrogen. Therefore each molecule of water contains just as many As. of hydrogen as a molecule of hydrogen. As the formula for water is H_2O, it follows that a molecule of hydrogen contains two As. If the molecular weight of hydrogen be taken as 2, the molecular weight of any vapour can be obtained by comparing the weight of a given volume with the weight of an equal volume of hydrogen at the same conditions of temp. and pressure. If the molecular weight of all compounds of oxygen be found in this way, and if each compound is decomposed and the weight of oxygen determined with relation to the rest of the constituents, the weight of the As. of oxygen in the molecules of its compounds can be calculated. These will bear a simple relation to each other, and the least is taken as the atomic weight, for it is assumed for this purpose that an element enters into at least one compound as a single atom.

In this and other ways the atomic weights of all the elements have been determined and tabulated. At first it appeared as if they would all bear a simple relation to one another, but this proved to be illusory, and many of the early atomic weights which were relied upon on account of their simplicity have been superseded by more accurate determinations. The whole mechanism of formulæ and equations is based on atomic weights, so that the progress of chemistry may be said to be determined largely by the atomic theory. In considering organic compounds we find no such simple procedure as in inorganic substances; some of the molecules, such as that of sucrose, $C_{12}H_{22}O_{11}$, contain a surprising number of As., and the molecules are credited with a certain structure in which the various As. have peculiar tendencies and affinities. On the whole, however, it may be said that the atomic theory provides a good foundation for the theory of organic chemistry, and a number of interesting syntheses have been made possible through its instrumentality.

The A. has at any rate probably a complicated structure. To meet the requirements of electricity, it has been suggested that each A. consists of a number of negatively charged 'electrons' revolving round a positively charged centre. In certain circumstances these electrons get free and proceed centrifugally as rays. This theory has the advantage of fitting in with sev. facts connected with radio-active substances and with chemical theories of valency. The cathode rays or β-rays emanated from radioactive substances are negatively charged particles of matter, whose mass is approximately $\frac{1}{1840}$th that of the hydrogen A. By such means the mass of the chemical A. is constantly diminishing, and Rutherford, Soddy, and Ramsay have shown that radium continuously produces helium, a very light inactive gas. Thus the conception of the essential integrity of the chemical A. has undergone modification. In recent years much time and thought have been given by scientists to the nature and structure of the atom, and the research work which has been done has been fruitful in results. It is now generally held that the atoms of the different elements have the same type of structure. They consist of a positively charged central

nucleus (proton) surrounded by negative charges of electricity—electrons. This disposition of the atom has been well compared to a solar system in miniature—the electrons moving round the central sun or nucleus. In any given atom in a state of normalcy the number of unneutralised protons in the nucleus is equal to the number of revolving electrons. In other words, the excess of positive over negative charges in the composition of the atom is equal to the number of revolving electrons. This figure represents the Atomic Number and also represents the atomic position in the series of elements. The Atomic weight is equal to the number of unit positive charges or protons in the nucleus which renders them electrically neutral. When an atom is electrically unbalanced—that is, when it has an excess or a defect of one or more electrons in its composition—it assumes marked chemical properties and becomes a traveller or 'ion.' It is the behaviour of these 'ions,' their different combinations with other 'ions' that forms the basis of the science of chemistry.

It has been stated above that the Atomic Number is equal to the positive electric charge on the nucleus or to the number of revolving electrons. From his experiments at Manchester, Moseley discovered that the best method of determining this number was by deducing it from the wavelengths of the high frequency spectra by the application of the law which ears his name. Moseley demontrated that the atoms of the different lements moved from the lowest to he highest in regular arithmetical rogression, and inferred that each ove must be the addition of a sitive charge to the nucleus. he himself announced, 'We have e a proof that there is in the atom undamental quantity which inases by regular steps as we pass n one element to the next. This ntity can only be the charge on entral positive nucleus.

r atomic theory see Roscoe and en, *New View of the Origin of n's Atomic Theory*. For modern ptions, see E. da C. Andrade, *ructure of the Atom*.

mic Heat, the capacity for heat sed by the atoms of different ts. Dulong and Petit, by a determination of the specific thirteen of the solid elements showed that a simple relation between the chemical equiva- the specific heat of these es. They therefore concluded pecific heat of the substances ersely as the A. weight, and to adopt as the A. weights those numbers which, multiplied the specific heat, gave a constant duct. Within certain limits of te the theory is true for the grea number of elements in the solid sta Thus if we take a number of gramm of an element equal numerically the A. weight, as, for instance 35 grammes of chlorine, 12 grammes carbon, we find that they requi approximately the same amount heat to raise their temp. one degree The theory is useful in determining the A. weight in doubtful cases.

Atomy, properly the plural of atom (*atomi*), was used as a singular noun meaning a mote, a speck. It was also used to denote a diminutive, insignificant being, a pigmy. Shakespeare's *Romeo and Juliet*, I. iv. 57, 'Drawn with a team of little atomies.' Also used by Shakespeare and other authors as a term for a skeleton (abbreviation of anatomy).

Atonement, a theological term denoting the doctrine of the necessity for a means of some form of satisfaction or reparation for sin, leading to reconciliation between God and man. Such a theory presupposes that the natural relation of God towards man is favourable, that it has been disturbed by man's sin, and that a restoration of the previous relation is possible. The means of this restoration, *i.e.* the problem of the A., is one of the greatest and most difficult questions of theology.

The term is common in the O.T., but its teaching on the subject is very varied and disconnected. Its general trend, however, through the rites of sacrificial law, is towards vicarious A., though the ideas of punishment, repentance, and amendment are frequently included, and this sacrificial theory is connected with Christ by the writers of the N.T. Here the word 'atonement' is only used once, such terms as 'reconciliation,' 'propitiation,' and 'salvation' taking its place with various meanings. The teaching of St. Paul is directly in the line of the Jewish doctrine of vicarious suffering, the death of Christ being held to satisfy the outraged divine righteousness. St. John looks upon Christ more in the light of a propitiation for man's sin, provided by the love of God, and as man's advocate with God, while the writer of Hebrews teaches that Christ's death is the transcendent completion of the ritual of the law.

Later Christian interpretations of the A., while in the main following St. Paul's substitutionary doctrine, have assumed many different forms. The early fathers paid more attention to the Incarnation, but seem to have held that the death of Christ was

aid to the devil for the of whom he was lawful e subject was raised into ortance by Anselm's treatise *Homo*, which regarded the ssary to satisfy the honour nd the offering of Christ as ent value to outweigh man's his is sometimes referred to as mmercial Theory.' The chief at the Reformation was on bstitutionary basis, holding o satisfy the divine justice, bore a punishment equivalent at deserved by man. Later ies were that of Socinius, teach- that the Crucifixion was an rance of God's love, and an mple of obedience, and the 'Gov- mental Theory' of Grotius, to the ect that the A. took place to further divine gov. of the world by ex- iting God's hatred of moral evil.

The present tendency of thought on e subject is to modify the old objec- ive explanations of the A. either on substitutionary or governmental grounds in the direction of the sub- jective theories, taking up the atti- tude of the moral effect of the Passion on man. F. D. Maurice and McLeod Campbell hold to the view that Christ completely identified Himself with man, and in His death offered up an 'equivalent repentance.' Ritschl be- lieves that the main idea of the A. is not propitiation, but reconciliation. Dr. Dale's *Atonement* teaches that the need for Christ's sacrifice lies in an ideal law of righteousness, not in the personal demands of God. In all probability the view of Bishop Butler, that no theory of the A. is competent, is nearest to the truth.

Sir Oliver Lodge, in his suggestions towards a re-interpretation or modi- fication of the Christian doctrine of A., considers that the doctrine represents a survival of religious beliefs held some six centuries before the Chris- tian era, and cites Euripides' account of the sacramental tasting of blood by the Orphic congregations. Sir Oliver Lodge cannot admit that all religious creeds from barbarous times have any true ethical significance, and is unable to detect in the suffer- ings of Jesus anything of the nature of *punishment*, or that an angry God was appeased thereby. Nor again, that the leaders of theologic thought of to-day derive much satisfaction from the efficacy of infinite repent- ance. He denies the existence of any 'original' or 'birth' sin, and thinks that the consequence of such a belief leads to the denial of the hope of a her humanity, merely in order that ns may be superhumanly ntifically, Sir Oliver birth as a case of parthenogenesis, and says that X-rays have the power to produce parthenogenetic developments in some lowly kinds of ova. The vicarious ex- piation, the judicial punishment of the innocent, and the appeasement of an angry God are, in his opinion, merely savage inventions that have left their traces on extant formulæ which have to be glossed. He con- cludes his inquiry into the validity of the doctrine of A. by taking up the position that man is beginning to realise a further stage in the process of A. and rising to the conviction that we are a part of Nature and of God, and that the union with Divinity and not anything legal or commercial is what science itself will some day tell us is the inner meaning of the redemption of man.

See H. Bushnell's *Vicarious Sacri- fice*, 1871; J. M. Campbell's *Nature of the Atonement*, 1871; R. W. Dale's *Atonement*, 1875; Oxenham's *Catholic Doctrine*, 1881; J. Denny's *Death of Christ*, 1903; Ritschl's *History of the Doctrine of Justification and Atone- ment*, translated 1900; G. B. Stevens' *Christian Doctrine of Salvation*, 1905; Sir Oliver Lodge's *Man and the Universe*, 1911.

Atooi is the name of one of the larger Sandwich Islands, in the N. Pacific Ocean. Hills rise from the sea, and at a little distance back was well wooded, whilst the central peaks attain a height of 7000 ft. The island has a length of nearly 40 m., and is situated in long. 159° 40′ W., lat 21° 59′ N. The chief ports are Warmea and Hanalei.

Atossa, Queen of Persia, daughte of Cyrus, and wife successively o Cambyses, Smerdis the usurper, an Darius Hystaspis, to whom she bo Xerxes and three other sons, a whom she influenced to invade Gree She is mentioned by Herodotus is a prominent character in *Persæ* of Æschylus.

Atrato, a riv. of S. Americ W. Colombia, rising in the Cordilleras, at an elevatio over 10,000 ft. It flows almo N. for 400 m. into the Gulf of forming a large delta at its though none of these is na The riv. is navigable for about length, and at one time receiv attention as a possible bas canal across the isthmus. found around its tributaries

Atrauli, or **Attrowli**, a tn. N.W. Provs., in th India, 60 m. N.E. of A Aligarh, about 16,000.

Atrebates, an anct. peop Gaul, whose cap. was They formed a confeder Nervii against Julius Cæ

they were utterly defeated at Axona. A branch of them settled in Britain, where is now the co. of Berkshire. From their name comes the modern Artois (prov. of France).

Atrek, or **Attrek**, a riv. in the N. of Persia, flows partly along the frontier, then into the S.E. corner of the Caspian Sea. It is 250 m. in length, and almost dry at the mouth during the summer.

Atreus, in Gk. legend, the son of Pelops and Hippodamia, and brother of Thyestes. Homer tells us nothing of the bloody story which appears in the later tragedians and runs thus. As a result of their murder of their step-brother Chrysippus, A. and Thestes were forced to flee to Mycenæ, where A. became king. Thyestes seduced Aërope, his brother's wife, and was driven from the country. To avenge himself he sent Pleisthenes, a son of A. by his first wife, to kill his father, but A. slew him without recognising him. It was now the turn of A. to plan vengeance. He pretended reconciliation with Thyestes, and having slain his two sons, served them up at the banquet. Thyestes fled in horror. Later A., ignorant of her family, married Pelopia, the daughter of Thyestes, and he adopted Ægisthus, her son by Thyestes. Agamemnon and Menelaus, the sons of A. by Aërope, find Thyestes, and having brought him to their father, he is imprisoned, and A. sends Ægisthus to kill him. But Thyestes recognises his son by the sword with which the latter intended to slay him, and having made his own identity known to Ægisthus, the two decide to kill A. They do this, and seize the throne. It is noteworthy that though this is reputed the most horrible legend in Gk. mythology, no mention of it whatever is made in Homer. The legend figures in two plays of Sophocles and one of Euripides, all of which are lost.

Atri, a tn. of Italy, in the prov. of Teramo. Its fine Gothic cathedral ontains interesting frescoes and aintings. Pop. 13,200.

Atrium, the principal room of the nct. Rom. house. It contained the ptial couch, the hearth, and the mily gods. Though in early times it s used as the common living-room, more sumptuous times it came to be erved as a room for the reception clients and guests. There were ny varieties of atria. The word was applied to public halls and build-, such as the A. Vestæ, and was given to the porch or court re a temple or basilican church.

rocities, outrageously and un-sarily cruel deeds inflicted on a er of people, usually associated with war, but not necessarily co thereto. One of the earliest rec A. is that of the massacre by He the children when Christ was Other well-known instances are putting out of the eyes of 15,000 garian prisoners by the Gks. in 1 the massacre of British subjects Indians at Cawnpore during the In Mutiny, 1857, and the Bulga atrocities of 1876. The A. commit by the Turks in the nineteenth c tury on the Armenians were amo the most callous in history, particular their massacre of children. Adu and grown-ups were tortured to dea by every conceivable 'means know to the Eastern mind.' The revoltin 'custom' of Dahomey, W. Coas Africa, was of an atrocious kind i that prisoners of war were trussed u and thrown into a pit and ther butchered to death, or they were de-pended from a gallows by their feet and allowed to die. In modern times Germany's treatment of the Belgian civil population in the Great War is regarded as one of the grossest outrages of civilisation. The official 'Report on the Violation of the Rights of Nations and of the Laws and Customs of War in Belgium' gives an account of some of these A. The most revolting was the practice the Germans adopted of driving civilians, women and children, in advance of their troops, using them as a living screen from behind which they were able to fire on their enemy. The unrestricted U-boat campaign and the sinking of the *Lusitania* (*q.v.*) and Allied hospital ships may also be classified as A. (*see also* ARMENIAN ATROCITIES).

Atropa, a genus of Solanaceæ, containing many poisonous species. *A. Belladonna*, deadly nightshade, grows in thickets and hedges of Britain, and has a purple flower like a small potato flower. It contains *atropin*, from which belladonna is made; the drug is used in medicine in cases of nervous diseases, and when injected into the eye causes a dilation of the pupil. The berries are poisonous, as are the roots and leaves. *A. mandragora*, the mandrake, found in S. Europe, is an even more dangerous species.

Atropatene, the anct. name of the prov. of Azerbaijan, in the N. of Persia, said to have been named after Atropates, whom Alexander made governor of it. It is extremely mountainous and contains Lake Urumiah, on the banks of which stands the anct. city of the same name. Capital, Tabriz.

Atrophy, the diminution in the size of a tissue or organ, the result of degeneration of the cells or a decrease in the size of the cells. The immediate

cause of such degeneration is the cessation or diminution of the supply of nutriment to the part. The opposite condition is *hypertrophy*, when increased nutrition causes an enlargement of the tissues. A. may be due to loss of functional activity when such activity has become unnecessary, as in some embryonic appendages, the shrivelling of the ovaries after the child-bearing period, etc. It thus plays an important part in the process of evolution, procuring that a part which is no longer used gradually passes out of existence. A. occurs when the normal supply is obstructed by accident, disease, or deliberate constriction. The shrinking of the feet in Chinese women is an example of the latter, and probably certain forms of A. of the liver may be traced to the practice of tight-lacing. Yellow A. of the liver is an acute disease of doubtful etiology. It is characterised by increasing jaundice, vomiting, the presence of a large amount of bile, with leucin and tyrosin in the urine, and is almost invariably fatal.

Atropine ($C_{17}H_{23}NO_3$), an alkaloid obtained from belladonna leaves or root. It is used in medicine as a sedative and local anodyne. In large doses the drug is a powerful poison, producing hallucinations, delirium, and a marked stimulation of the heart, which ultimately becomes paralysed. When dropped into the eye, A. causes marked dilatation of the pupil and at once relieves pain in that organ. It is used externally to relieve neuralgia, and in small doses as an antidote to opium poisoning.

Atropos, 'The Unalterable' (Gk. ἀ, privative, and τρέπειν, to turn), the eldest of the Fates, whose duty it was to cut the thread of human life, which had been measured by Clotho and drawn out by Lachesis. She is generally represented with a cutting instrument, scales, or a sun-dial.

Atrypa (Gk. ἀ, without, τρυπάω, I pierce), a genus of brachiopod molluscs of the order Telotremata and family Atrypidæ. They are found chiefly in the Silurian system.

Atschuisk, a tn. of Asiatic Russia, situated on a trib. of the Ob. Founded in 1642, it is the cap. of a dist. of over 80,000 inhabitants. Pop. 6000.

At Sight, a commercial term used upon bills of exchange with a meaning equivalent to 'on demand.' Days of grace do not apply to bills payable at sight.

Atsuta, a tn. of Japan, 70 m. E. of Kyoto, on the S.E. coast of Houshin. Pop. 18,000.

Attaca (It., attack), a musical term signifying that the next movement is to be continued immediately, without an intermediate break.

Attaché (Fr., attached), a subordinate attached to the suite or company of a commanding officer. In practice, the term is restricted to military or naval As., who are young diplomatic officers, attached to an embassy or a legation, or travelling with an ambas. to a foreign country. It is their duty to make themselves familiar in an honest fashion with the naval and military condition of the country they are in, and to report on all matters likely to be of interest and value to the home gov. In time of war there are various As. at the headquarters of each army. This post is then generally conceded to the envoys of those foreign powers who need representatives at the seat of war.

Attachment, a legal process by which a defendant may be brought before a court by the taking of his person or his goods. The writ is issued to the sheriff. It is a process properly applicable to the offence of contempt of court, and therefore is not necessary where the offence has been committed in open court, for the offender is then present, and can be dealt with without the necessity for A. It differs from arrest in that it can be effected on a man's goods as well as his body, and also that the person attached is kept till the day appointed and not brought before a court at once. It differs from distress in that it is not applicable to lands, but only to goods. County courts can only punish for contempt in presence of the court, and therefore cannot issue writs of A.

Attachment of debts.—By the Common Law Procedure Act, 1854, and Judicature Act, 1873, a creditor, after obtaining judgment against a debtor, and after affidavit that the debt is not paid and that debts are owed to the debtor by a third party, may attach all such debts and issue execution if the third party does not dispute the debt. Wages of a servant, labourer, or workman (Wages Attachment Abolition Act, 1870), and of a seaman or apprentice (Merchant Shipping Act, 1894) are not open to A. In the United States, in most states, a debtor's property or goods may be seized by order of the court before judgment as security for the creditors. Usually this is only allowed where the debtor is guilty of fraud, is likely to abscond, or has done so.

Foreign attachment.—A legal process peculiar to the Mayor's Court in London and also in Bristol, Exeter, and Lancaster, by which a creditor may, before judgment, attach money owed to the debtor or property belonging to him in the hands of third parties. *See also* GARNISHEE.

Attainder (Norman-Fr. *atteindre*, Lat. *attingere*, to reach, to touch

upon). The erroneous derivation of the word from the Lat. *tingere*, 'to dye,' 'to taint,' had far-reaching consequences on the Eng. common law, giving rise, as it did, to the doctrine of 'corruption of blood.' A. is the consequence which follows from the passing of sentence of death upon a criminal, or of outlawry in cap. felonies, outlawry in these cases being equivalent to a sentence of death. By the sentence the prisoner became *attaint*, that is to say, he lost all power over his property, and was incapable of performing any of the duties, or enjoying any of the privileges, of a freeman. The blood of the prisoner was said to be corrupt or tainted, and his estate was forfeited to the crown in case of treason, or escheated to the lord of the manor in the case of felony. In cases of A. for murder, the forfeiture of freehold lands to the crown was for a year and a day, during which time the king had unlimited power of committing waste upon it, but after that period the lands were escheated to the lord from whom they were held. A dignity descendible to the heirs general was also forfeited to the crown, and by the doctrine of corruption of blood neither land nor titles descended to the children of other heirs of an attainted person. By an Act of 1870 A. was abolished in ... except that or ... the loss of land ... with a total ... rights. In the ... known, the constitution forbidding the enactment of any bill of A. by congress or by any of the state govs. In Eng. history, on the contrary, there have been frequent instances of As. by express legislative enactment, called bills of A. These enactments provided for the attaint and punishment of persons held to be guilty of offence against the peace and security of the state, and were known as Bills of A., or Bills of Pains and Penalties. The effect of such a Bill is to supersede the ordinary process of law, and although the imprisonment and execution of persons by this means are entir... from the sou... yet in both its ... dministration ... Persons were attainted upon mere hearsay evidence, and some upon no evidence at all, without being heard in their defence. The practice of introducing Bills of A. into parliament arose in the reign of Richard III., somewhere about 1477, and by the end of the reign of Henry VIII. the proceeding by Bill of A. became painfully common. Scarcely a year passed without persons of the highest rank being ... by this means. ... Earls of Surrey ... r being 'hoist with his own petard,' as he had counselled the king to adopt such measures) and Cromwell. Under the Stuarts recourse was seldom had to this extraordinary mode of proceeding, but it was adopted by the Long Parliament against Lord Strafford. His A. was reversed after the restoration of Charles II., and all records of ... lled by Act of ... other hand, in ... our regicides— ... Ireton, and Pride—were attainted, although in their case, as in the case of Strafford, death had removed them from human jurisdiction. The last execution to take place by means of an Act of A. was in 1797, and the most recent instance of a Bill of pains and penalties is that directed against Queen Caroline, the wife of George IV., in 1820.

Attaint, a writ, which formerly lay to inquire whether a jury had given a false verdict. It was first introduced by Henry II. at, it is said, the instance of Chief Justice Glanville. At first it only lay on the trial of writs of assize, but it was extended gradually, and by the reign of Edward III. it applied to all pleas whatsoever, whether real or personal, except writs of right, where the issue was joined on the *mere right*. If the jury on the A., who were twenty-four in number, found that the verdict was false, the judgment against the jury who found the false verdict was very severe. But more moderate judgment wa... reigns of Henr... So ineffectual, ... ceeding, that i... it gave place ... practice of setting aside verdicts on motion and granting new trials. By the 6 Geo. IV. c. 50, which consolidated the laws relating to juries, proceedings by way of a writ of A. were abolished.

Attalea, a genus of S. American palms (order Palmæ). *A. funifera*, called *piaçaba* by the natives, yields a very strong fibre used in rope-making.

Attalus, name borne by three kings of Pergamus: (1) Surnamed Soter, resigned 241–197 B.C., became an ally of Rome in that city's struggle against Philip of Macedon and the Achæans. He was wealthy, just, and wise, and a liberal patron of literature. (2) Surnamed Philadelphus, reigned 159–138 B.C., succeeded his brother Eumenes. Like his father, he was an ally of Rom. and a great patron of the arts. (3) Surnamed Philometer, reigned 138–

133 B.C.; by his will left Pergamus to the Rom. people. There are conflicting accounts of his life.

Attalus, a senator of Rome, under the reign of Honorius, was sent by the Roms. to that emperor at Ravenna, to represent to him the difficult situation of the capital, threatened at that time by Alaric, and to advise him to fulfil the conditions of a treaty which he had concluded with that Gothic chief; but Honorius refused, and Alaric, being joined by his brother-in-law, Ataulphus, laid siege to Rome. A., who was then prefect of Rome, was proclaimed emperor by Alaric, who required the Roms. to swear allegiance to him A.D. 409. A. then went with an army of Roms. and Goths to besiege Honorius in Ravenna, who proposed to associate him in the empire, but A. refused to listen to the proposals, thinking himself possessed already of the real power. A., however, having opposed Alaric in some of his views, was immediately deposed by the Gothic chief. After this, Alaric again besieged Rome, took it, and gave it up to pillage in August 410. Upon Alaric's death, A. followed the fortunes of his successor, Ataulphus, whom he accompanied into Gaul. After the death of Ataulphus, his successor, Vallia, having concluded peace with Honorius, A. endeavoured to escape the emperor's vengeance, but was taken, and, by order of Honorius, confined in the island of Lipari, after having had the fingers of his right hand cut off, in order to prevent him from being able to write. A. was afterwards recalled to Rome, where he died in obscurity. (Zosimus, Orosius, and Gibbon.)

Attalus, general under Philip II. of Macedon, and uncle of Cleopatra, whom Philip espoused *c.* 337 B.C. At the wedding, he offended Alexander, son of Olympias, whom Philip had repudiated, by expressing a wish for a *legitimate* successor to the throne. After the death of Philip, he opposed Alexander, but his soldiers deserted him and he was slain.

Attap, or *Nipa fruticans*, is the single species of a genus of Palmæ. The one-seeded fruit is hard, and the large leaves are used for purposes of thatching in Africa.

Attar, Ferid-ud-Din (1119-1220), a famous mystic and religious poet of Persia, author of many works, some of which are now lost. Among the extant ones may be named the *Mantik-ut-Tair*, and the *Book of Good Counsels*. He perished in the invasion of Persia by the Mongols under Genghis Khan.

Attar of Roses, the essence or oil of the *Rosa centifolia*, or *Rosa damascena*, produced from these flowers by distillation in water, the oil being then collected from the surface of the water by means of a feather. It is chiefly prepared in Persia, India, and Turkey, from which countries it is exported in small vials. The perfume is very costly, and is in itself too strong to be at all pleasant. It is freely used as an ingredient in other perfumes, a few drops of it scenting a great quantity. It is also known as Otto of Roses.

Attempt, a technical term in criminal law applied to an act done with the intent to commit a crime. In England any act which if uninterrupted and successful would have been a crime, is regarded as an A., even if the accused of his own free will decides not to carry out his original intent. An A. murder, however, is termed felony.

Attention, in psychology two kinds of attention are recognised: (1) The passive, being the concentration of the consciousness upon a definite object or objects by isolating the perception from other objects. As all consciousness depends upon a certain degree of isolation, such passive attention may ultimately be regarded as the necessary condition of consciousness. (2) The active, being the voluntary act of fixing the mind upon a definite object or objects. The force of this act of volition varies with the individual, and is capable of development. The general psychological character of attention has been receiving considerable attention in recent years.

Atterbom, Peter Daniel Amadeus (1790-1855), the great poet of the romantic movement in Sweden, was *b.* in E. Gothland. He studied at the University of Upsala, where he founded the Aurora League, a society for the reform of Swedish literature. The league conducted in succession various literary organs: *Phosphorus* (1810-13), the *Poetical Calender* (1812-22), in which some of their own works appeared, and the *Swedish Literary News* (1813-24). Among As. own works the best known are the *Isle of Blessedness*, a beautiful romantic drama which has enjoyed great popularity, and the series of lyrics entitled *The Flowers*, which introduced the sonnet to Sweden. He also left an unfinished fairy drama, *The Blue Bird*. His works are marred by a tendency to introduce philosophic and religious meditations and allegory. In 1835 he was made professor of æsthetics and literature at Upsala, and in 1839 he became a member of the Academy. His *Swedish Seers and Poets* is an interesting series of biographies.

Atterbury, Francis, Bishop of

Rochester (1662–1732), distinguished as an English man of letters, a bishop, and a politician, was *b.* at Middleton Keynes in Buckinghamshire. He was educated at Westminster School, from which he proceeded to Christ Church, Oxford. As a Protestant, he answered an attack made on the spirit of the Reformation which aroused the indignation of the Papists by the vigour of its rhetoric. He took holy orders in 1687, and readily swore allegiance to William III. after the Revolution. He won great fame as a preacher, and became in
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who was Boyle's tutor. He distinguished himself also by his defence of ecclesiasticism against the attacks of the civil law. In 1701 he became an archdeacon, a prebendary of Exeter Cathedral, and a D.D. He was probably instrumental in the drawing up of Sacheverell's defence also. In 1704 he became dean of Carlisle, in 1709 preacher at Rolls Chapel, in 1712 dean of Christ Church, in 1713 bishop of Rochester and dean of Westminster. He took part in the coronation of George I., but his influence was destroyed, since his leanings towards Jacobitism were known. In 1717 he held direct communication with the Pretender. In 1721 he was arrested
plot to proclaim
1722 imprisoned
he was deprived
hed. He entered the service of the old Pretender and *d.* in France in 1732. He was buried secretly in Westminster Abbey. He numbered amongst his friends and correspondents all the great literary men of the period.

Attestation. Most important legal documents, especially wills and deeds (*q.v.*), require to have the signature of the person making the instrument attested by one or more witnesses or 'attestors.' All deeds are required by Scots law to have two witnesses, unless there is special statutory exemption, and in England wills and grants of land to charities must have two attestors. In Scotland no deed is valid if written by another than the party making the deed unless the testing clause (*q.v.*) is regular. The A. of two justices is necessary to the indenturing of pauper apprentices to the sea. One witness is necessary to a bill of sale, and to witness a warrant of attorney or a cognovit (*i.e.* an admission by a defendant of the justice of the whole or part of a plaintiff's claim) the signature of a solicitor is obligatory.

Attfield, John (1835–1911), an Eng. chemist. Demonstrator of chemistry at St. Bartholomew's Hospital, 1854–62; professor of practical chemistry to the Pharmaceutical Society of Great Britain, 1862–96. He was one of the founders of the British Pharmaceutical Conference and the Institute of Chemistry. Acted as coeditor of the *British Pharmacopœia* in 1885 and as ed. in 1898; author of *A Manual of Chemistry*, 1867.

Atthis, a genus of small humming-birds found in South-western U.S.A. and elsewhere.

Attic, a term in architecture designating a low storey introduced above the main cornice in the elevation of a building. An *A. base* is a form of base employed in the Ionic order, and sometimes in the Corinthian. It consists of two toruses, separated by a scotia, resting upon a plain square plinth.

Attic Dialect, the language of Athens during the period of her literary greatness, originally a development of the Ionic dialects. It is the basis of ordinary Gk. grammars, the Æolic and Doric dialect forms being given as variants.

Attica, one of the divs. of anct. Greece of which Athens was the cap., bounded on the N. by Bœotia, on the W. by Megaris and the Saronic Gulf, on the S. by the Ægean Sea. It was a fertile and prosperous state, and sent out many colonies. Striking features of the country are the mts. of Hymettus and Laurium, the latter of which contains silver mines.

Atticism, an elegant and classic phrase, characterised by brevity and intellect. The Attic dialect was the purest and most literary of the Gk. dialects. *Attic salt* signifies a poignant and delicate wit peculiar to the refined Athenians and foreign to the blunter Roms.

Atticus, T. Pomponius (*c.* 109–32 B.C.), a Rom. knight, *b.* at Rome. His real name seems to have been Quintus Cæcilius Pomponianus Atticus; the latter name being given him from his residence in and knowledge of Athens, and his deep acquaintance with the Grecian literature and tongue. Amongst his fellow-students may be mentioned C. Marius and M. Cicero. He left Rome on the outbreak of war between Marius and Sulla, and took up residence in Athens. He refused to take sides in the civil war, and was an intimate friend of the leaders of all parties. He was a believer in the Epicurean philosophy. He was a great friend of Cicero, from whom he received many letters which are still extant, and a

number of whose works he read and corrected.

Atticus Herodes, Tiberius Claudius (*c.* 104–180 A.D.), a famous Gk. teacher of rhetoric, who was *b.* at Marathon. His fame as a teacher of rhetoric was equally known at Rome and at Athens. He numbered amongst the more famous of his scholars the future emperor, Marcus Aurelius, and his future colleague, L. Verus. He became a consul in the year 143. He was exceedingly wealthy, and spent a great part of his wealth in beautifying with magnificent buildings the Grecian tns. of Athens and Corinth.

Attidian Brethren, a body of twelve priests in Umbria who had wide authority in that region. The Eugubine Tablets are the records of their acts.

Attila (the Scourge of God) (*c.* 406–453), King of the Huns, succeeded his uncle Rugilas with his brother Bleda in 433. He claimed for himself divine origin and descent, and from the finding of the so-called 'sword of Mars,' claimed the dominion of the earth. Bleda was put to death in 445, and A. was able to proclaim himself King of the Barbarians from the North Sea to the boundaries of China. He ruled over the Vandals, Ostrogoths, and Gepidæ. In alliance with Genseric he invaded Mœsia and defeated the forces of Theodosius II. He devastated the whole of the E. portion of the empire, and Constantinople only saved itself by means of its impregnable fortifications. The whole of the Balkan Peninsula was at his mercy, and Theodosius was forced to make peace with him practically on his own terms (446). In 450 a Rom. conspiracy against his life was formed, and in the same year he prepared to invade Gaul. He besieged the tn. of Orleans in 451, but an alliance of the Roms. and Visigoths forced him to raise it and defeated him at Châlons, where 200,000 men are said to have perished. Forced back into Hungary, he invaded Italy in the following year, place after place falling into his hands, and Rome itself was only saved at huge expense. In the next year he *d.*, 453, and with the death of A. his empire fell to pieces.

Attiret, Jean Denys (1702–68), called Frère A., a Fr. painter, was *b.* at Dôle, and *d.* at Pekin. He was first instructed by his father, but completed his studies at Rome. He first practised at Lyon, and then at Avignon, where he was a lay-brother of the Jesuits. In 1737 he went to Pekin, as the Fr. Jesuits at that place wanted a painter. He soon obtained the favour of the Emperor Kien Loong. At first he was envied by the Chinese court-painters, but he afterwards succeeded in conciliating them by asking them to assist him in his work. He was made a mandarin by the emperor, but, being a Jesuit, he was unable to assume the title.

Attle, a miner's term for dirt or rubbish left over after the ore is worked. Originally a Cornish term.

Attleboro, a tn. of Bristol co., Massachusetts, U.S.A., 32 m. S.W. of Boston. The tn. manufs. jewellery, silver ware, cotton goods, etc. It comprises sev. vils. and contains the Attleborough Home Sanatorium and a good public library. Pop. 21,769.

Attleborough, a market tn. in the co. of Norfolk, England, 15 m. S.W. of Norwich by rail. In the fourteenth century it had a college of the Holy Cross, and its anct. parish church contains some interesting remains. Pop. 2453.

Attock, a tn. and fort of British India, in the Punjab. It is situated on the l. b. of the Indus, 45 m. E.S.E. of Peshawar, and was founded in 1581 by the Emperor Akbar. It is an important strategic position, as here is the chief bridge over the Indus. It has been the route by which almost all the invaders of India by land—Alexander, Tamerlane, etc.—have made their approach.

Attorney, 'one substituted' (from *atourné, attornatus*, respectively derived from the Fr. *atourner* and the Lat. *attornare*, to substitute), signifies in its widest sense one put in the place or *turn* of another to manage his affairs. For its use in this general sense, *see* articles POWER OF ATTORNEY. In the narrower sense an A., or more properly an *attorney-at-law*, was the name given prior to the Judicature Acts, 1873–5, to those members of the legal profession who represented litigants in the courts of common law and brief council on their clients' behalf. The equivalent term for those who practised in the chancery, or equity courts was 'solicitor.' Since the enactment above referred to, which extended equity to all courts, the title of solicitor is applied to both solicitors and As. *See*, therefore, article SOLICITOR. In the United States the term A. includes both barristers and solicitors.

Attorney, Letter or Power of, *see* POWER OF ATTORNEY.

Attorney-General. The A.-G. is the chief law officer of the crown and chief legal adviser to the gov. He is appointed by letters-patent, and his office is in many respects similar to those of the lord-advocate of Scotland (*q.v.*), though less extensive and more clearly defined. Originally, he was simply the king's A., and stood in the same relationship to the king as any other A. does to his client. The additional term 'general' probably

arose from the need of differentiating him from As. appointed to act for the crown in particular courts, such as the A. for the Court of Wards, or the 'coroner and A. for the king,' the official name for the master of the crown office in the King's Bench Division. The origin of the office is obscure, the first mention of the title being in the reign of Edward I. towards the end of the thirteenth century, when the holder of it is called the *attornatus regis*. Gradually the office has become one of great dignity and importance. Till recently the king's serjeant was the chief officer of the crown in criminal proceedings. A dispute between this officer and the A.-G. as to precedence was settled in 1811 by George IV., then prince regent, declaring by a special warrant that the A.-G. and the solicitor-general should have precedence over all other members of the Eng. Bar. A similar problem as to precedence between the lord-advocate of Scotland and the A.-G. arose in 1834, and was decided in favour of the latter. The A.-G., like his confrère the solicitor-general, is always a member of parliament and a member of the ministry. He is paid £7000 a year, and receives fees for crown business, but he has not now the right that he formerly enjoyed of engaging in private practice. Till 1912 the A.-G., though a member of the ministry, was not a member of the cabinet or of the privy council, but in that year Sir Rufus Isaacs, M.P. (later Lord Chief Justice) was given a seat in the cabinet. The duties of the A.-G. are to represent the crown in criminal prosecutions, particularly in those heinous misdemeanours that tend to disturb or endanger the state, and in civil cases to conduct suits and prosecutions relating to public revenue. As head of the Bar he decides questions of professional etiquette. The .-G. for Ireland has similar duties, nd the duchies of ancaster and the co. palatine of urham each have their A.-G. The -G. of the U.S.A. government fers in some respects from his glish prototype. The lawyer osen for this post is always a yer of eminence, though not necesly in the front rank of the Bar, tical considerations having, as in land, much to do with deterng the President's choice. The . exercises a general supervision the Federal judicial departs, and more especially over istrict attorneys (*see* DISTRICT RNEY) and those executive officers called United States als. Further, he is a fully l member of the President's cabinet, and is the regular adviser of the President, a fun of especial importance, in all t difficult questions which arise a the constitutional limits of the ex tive power of the President, and relations of Federal to state author In England the A.-G.'s opinions treated as confidential, but those the American A.-G. are often pu lished officially, not only in justific tion of any particular line of acti taken by the President, but to infor the world of the view which th executive takes of its legal positio and duties in any matter of moment These opinions have a quasi-judicia authority although they are only o 'persuasive' and not 'authoritative' efficacy, inasmuch as the Federal Court can override them. *See* Bryce's *American Commonwealth.*

Attraction (Lat. *attractio*, from *ad*, to, *trahere*, to draw), a condition of stress such that two bodies tend mutually to approach one another, and to resist separation. Various kinds of A. are those exercised in gravitation, capillary A., chemical A., cohesion, magnetic A., and the universal A. which regulates the movements of the planets. The laws of gravitation were first formulated by Newton, and his law for the A. of masses may thus be stated. Any two particles of our planetary system, of mass M and M_1 respectively, separated by a distance D, exercise upon each other an A. which may be denoted as $f\frac{MM_1}{D^2}$ where f is a constant; *i.e.* gravitational A. follows the law of inverse squares. The forces of gravitation and magnetic A. act when the bodies are distant from one another, whereas in cohesion (which follows the laws of gravitation) and chemical A. the bodies must be in contact.

Attrek *see* ATREK.

Attribute, properly a necessary property or characteristic of a thing, is used in painting, logic, and metaphysics with special meanings.

In logic an A. of a thing is any quality or characteristic which belongs essentially to it, which may be specifically predicated of it. It is in this use opposed to accident.

In metaphysics an A. is the nec sary quality of a substance, wheth material or spiritual. In Spinoz philosophy, for instance, an A. is th which the mind perceives as cons tuting the essence of the thing question. Divine substance, he say may have an infinite number of As but human minds can perceive onl extension and thought.

Attwood, Thomas (1765–1838), musician and composer, was the son of a coal-merchant, but was s

the Prince of Wales to study music in Italy. On his return he became organist of St. Paul's, and composer to the Chapel Royal.

Attwood, Thomas (1783–1856), Eng. banker and politician. He was directing his father's bank at Birmingham when the reform question was agitating the country. In 1830 he assisted in the foundation of the Political Union which contributed powerfully to the passing of the Reform Act.

Atwater, Wilbur Olin (1844–1907), American chemist, *b.* at Johnsburg, New York, First Director of the Connecticut Agricultural Experimental Station and a Director of Stoor's Agricultural Experiment Station, and from 1894–1905 he had charge of the Nutrition Investigations of the United States Department of Agriculture. Among his publications is *An Experimental Inquiry regarding the Nutritic Value of Alcohol.*

Atwood, George (1746–1807), mathematician and physicist, was *b.* in London. He was educated at Trinity College, Cambridge, and having graduated with high honours, was elected a member of the Royal Society in 1776. He wrote various papers for *Philosophical Transactions*, and among his other works may be named his *Treatise on the Rectilinear Motion and Rotation of Bodies, with a Description of Original Experiments Relative to the Subject*, 1784, which described the apparatus known as A.'s Machine, to demonstrate the laws regulating falling bodies.

Atwood's Machine, an apparatus designed to demonstrate the relations of time, space, and velocity in the motion of a falling body. It consists essentially of a wheel over which two masses are suspended, weighing respectively, say, 49½ grammes and 50½ grammes. The total mass is therefore 100 grammes, and the force acting upon the machine is due to the excess in weight of one body over the other, that is, one grammo. Let this gramme be a piece of wire which can be removed by a ring on one of the supports of the wheel. A pendulum is provided which regulates a timepiece. The heavier weight is supported by a plate which can be dropped as the pendulum ticks. The ring is slid down so that the weight takes exactly one second to reach it, which can be arranged after some trials by making the click of the wire on the ring and the tick of the pendulum coincide. The weight, relieved of the wire, still travels downwards until it is stopped by a plate arranged as before to catch it at the end of one second. This plate will be found to be about 9·81 centimetres below the ring. That is to say, the weight of one gramme, acting for one second, has imparted to the whole mass of 100 grammes a velocity of 9·81 centimetres per second. This additional velocity is the acceleration due to gravity, which may be measured in dynes by multiplying the mass by the acceleration, thus: $F = m_a = 100 \times 9{\cdot}81 = 981$ dynes.

Atya, the name given by Leach to a genus of long-tailed decapodous crustacea. They have forceps ending in four claws; these are cleft as far as the base and thus appear to be composed of two fingers, or lashes, which are joined at their origin.

Atypus, a genus of spiders having six spinneret glands.

Atys, or Attis, a deity worshipped in Phrygia in connection with Cybele, whose worship gradually spread throughout the Roman empire and Asia Minor. The story of A. is told in various conflicting ways, the best known account being that by the Roman poet, Catullus.

Atzgersdorf, a manufacturing tn. in Lower Austria, 5 m. S.W. of Vienna; pop. 5800.

Auah, *see* OUDH.

Aubagne, a tn. in the dept. of Bouches-du-Rhone, S. France, on the Huveaune, E. of Marseilles. Its chief manufs. are pottery and leather, whilst the wine of the dist. is also renowned. Its history has been varied and it has sev. times been sacked. Pop. 10,271.

Aubaine, an anct. French right by which the property belonging to strangers (not naturalised) or to Frenchmen who left their country became on their decease the property of the lord of the dist. or of the king. It was abolished in 1819.

Aubanel, Théodore (1829–86), a Fr. author who, in collaboration with Mistral and Roumanille, gave himself up to the work of reviving and carrying on the native Provençal dialect and literature. He kept up, however, his family trade of printing and editing. His best-known poem is *La Mivugrano entreduberto*. One play of his, *Lou pan dou pecat*, was acted in Provençal and in French.

Aube, dept. of N.E. France, bounded N. by Marne, N.W. by Seine-et-Marne, W. by Yonne, S. by Yonne and Côte-d'Or, and E. by Haute-Marne. It is formed of the S. part of the old prov. of Champagne and part of Burgundy. Its E. part is watered by the A. and its W. by the Seine, to the basin of which the dept. belongs. The climate is moist and mild, and the chief industry is agriculture. The N.E. is chiefly pastoral, but the S.W. is fertile, and here wheat, oats, vegetables, etc., are extensively cultivated. Chalk, potter's clay, building-stone,

and limestone are among the minerals, while cotton-spinning and weaving are the chief industries. Prin. exports, timber, cereals, wine. Cap. Troyes. Area 2326 sq. m. Pop. 231,009.

Aube, trib. of the Upper Seine, rises in plateau of Langres. Length 150 m.

Aubenas, tn. in the dept. of Ardèche, in S.E. France. It is built in a fine s tuation on the side of a hill. Chief industries, coal and iron mining, paper and silk making. Pop. of com. 6683.

Auber, Daniel François Esprit (1782–1871), Fr. composer of operas, was *b.* at Caen in Normandy. His father, a print-seller, sent him to London to acquire a knowledge of business methods, but the young man was already deeply imbued with a passion for music, to indulge which he returned to Paris in 1804. After producing some concertos for the violoncello, and violin, he reset the comic opera *Julie*. Intending to study music seriously, he now put himself under the tuition of Cherubini, and after writing a mass, part of which he later utilised in *La muette de Portici*, he produced a one-act opera, *Le séjour militaire*, which failed miserably. This failure led him to write nothing more until he was compelled by the death of his father in 1819 to make music his means of livelihood. After a half-success in *Testaments et billets-doux*, he scored a brilliant success in 1820 with *La bergère châtelaine*. In 1822 he began his association with . Scribe, the libretto-writer, and the wo began a series of popular and successful productions, among which may be named *Le domino noir*, 1837; *lac des fées*, 1839; *Les diamants de* *couronne*, 1841; *La fiancée du roi des* *bes*, 1864.

Aubervilliers, a tn. in dept. of Seine, France. Formerly numerous pilns came here to honour Notre-nes-des-Vertus. It has manufs. of micals, perfumery, etc. Pop. of mune 34,000.

Aubignac, François Hédelin, Abbé 604–76), Fr. author and critic, to the nephew of Richelieu, who rred on him the abbey of A. best-known work is a tragedy, *ie*, written in prose as an exemtion of critical rules, and he rranged these in his *Pratique du* *e*. He was the first to throw on the existence of Homer.

gné, Jean Henri Merle d' (1794– a Swiss historian, *b.* at Eaux- He studied here and at Berlin 1818, he became pastor of the testant church at Hamburg. rs later he removed to Brusere he was appointed court In 1830 he returned to Geneva and became professor church history in the newly-founde theological school there. He visite England on sev. occasions, where h was warmly welcomed, the Univer sity of Oxford conferring the D.C.L degree on him. His best-known work is the *Histoire de la Réformation au XVIième siècle*, 1835–53.

Aubigné, Théodore Agrippa d' (1552–1630), Fr. soldier and scholar, *b.* at Pons in Saintonge. He early showed a remarkable talent for languages, especially for the classics, but his attachment to the Huguenot cause made him spend the early part of his life in the military profession. He rendered good service to Henry of Navarre, whom he later criticised with freedom and candour. After Henry's assassination he retired to Geneva and resumed his literary studies. His best-known work is his *Histoire Universelle*, 1550–1601 (1616–20), which for its indulgence in satire was officially burnt in France. His satiric bent is also shown in most of his other works, *e.g.* *Confession Catholique du Sieur de Sancy*.

Aubin, a tn. in the dept. of Aveyron, S. France, on the R. Enne and the Orleans railway. In the vicinity are extensive coal and iron mines, the former of which have been worked since the middle ages. Pop. of com. 9740.

Aubin, St., a small picturesque tn., in the par. of St. Brelade, Jersey, at the W. end of St. Helier Bay. It has a small, but convenient harbour, a pier, and a market place, and the view from the adjacent point, Noirmont, is exceedingly fine.

Aubrey, John (1626–97), the antiquary, *b.* at Easton Percy in Wiltshire, his early education was given him at the neighbouring tn. of Malmesbury, at the grammar school which was then under Robert Latimer. In 1642 he entered Trinity College, Oxford, and in 1646 became a student of the Middle Temple, though he was never called to the Bar. In 1652, on his father's death, he succeeded to large estates, the subject, however, of innumerable lawsuits which eventually left him without any means of support, 1670. From this time he visited his friends, journeying from house to house till, in 1697, he *d.* at Oxford. Only one of his works, the *Miscellanies*, was pub. in his lifetime, but he left a large mass of material which was edited by others. His *Minutes of Lives*, given to Anthony à Wood, appeared in 1813, and his *Remains of Gentilism and Judaism* in 1880. His *Natural History and Antiquities of Surrey* had already appeared in 1719. The *Miscellanies* are full of interesting chatter, but A.'s

globe save Europe; his merit is proved by the fact that, though the son of a loyal and poor American colonist, he attained such eminence.

Auchterarder is a tn. in Perthshire, Scotland, 14 m. S.W. of Perth. It was the opposition to the presentee to the church of A., in 1839, which began the contest leading to the formation of the Free Church of Scotland. A. manufs. tweeds and tartans. Pop. 2263.

Auchtermuchty is a royal and police burgh of Fifeshire, Scotland. Native place of John Glas, founder of sect of Glassites in 1387. Weaving and distilling are carried on here.

Auckland is the name of a prov. of New Zealand, and also of the cap. of that prov.

The prov. of A. includes practically a half of the N. is., being 400 m. long and 200 m. wide at its greatest breadth. The bays of its coast-line afford safe harbourage, whilst its rivs. convey the produce of the interior to its ports. It is by nature formed into three divs., the N. peninsula, the E. coast dist., and the Waikato country. The soil is of two kinds, a light volcanic loam and a stiff yellow clay. A. is rich in minerals, gold, copper, tin, iron, and coal being found; the Kauripine, of which, also the fossil gum is exported, flourishes abundantly. The climate is pleasant and healthy, not so hot in summer as other parts of Australia at the same lat. Volcanic action has left effects on the land, and there are warm lakes and geysers 90 m. S.E. of A.; nearer A. is an active volcano. The pop. of the prov. is about 425,000.

The city of A. is a seaport on the E. coast of the prov. in Eden co. It was founded in 1840, and was cap. of New Zealand till 1865. It has some ne buildings, including a university llege (which forms part of the University of New Zealand), cathedral, d an Academy of Music, and it is e seat of a bishopric. It has splen- wharves and graving docks, and harbour on the western side in nukau, only 6 m. distant. It is nected with all the chief centres New Zealand by telegraph. In tion to its shipping trade, it has r and glass works, sawmills, r factories, etc. The pop. is 80.

ckland, Bishop, is a mkt. tn. of am, situated on the Wear, 9 m. Durham. There are sev. coal large coke-works, and en- ing works in the neighbour- Pop. 12,000.

kland, G. E., Earl of (1784– son of Baron W. E. Auckland. a steady supporter of reform, 1835 was made governor-general of India. The successful beginning of the unfortunate Afg war of 1838 won him his earldom.

Auckland, W. E., Lord (1744–181 the third son of Sir R. Eden, Baron of W. Auckland, Durham, was prominent politician and diplomatis He was chief secretary to the Iri viceroy, and in charge of a con mission which treated with th Irish insurgents. As minister-pleni potentiary to France he concluded commercial treaty in 1786, and wa afterwards ambassador to Spain and Holland, and postmaster-general. He was created Baron A. in 1793.

Auckland Isles, a group of is. situated 180 m. S. of New Zealand, were discovered by the whaler Bristow in 1806. Enderby, Adams, and Auckland are the chief is. They are valuable as whaling-stations, but have no settled inhabitants.

Auction, a method employed for the sale of property, which derives its name from the Lat. *auctio*, an increase, because the property was publicly sold to him who would offer most for it. The usual form of A. is to offer the property at a low figure, and by the competition of the various bidders, each offering a little more than the predecessor, to raise the price to that point beyond which the bidders refuse to go. The goods are then 'knocked down' to the highest bidder. The Dutch A., originating, as its name indicates, in Holland, is the reverse of this, and is a method generally employed by the 'Cheap Jack.' The property is offered at a higher price than is likely to be paid for it, and the price is gradually lowered till somebody bids for it. The first person to bid gets the property. The mere offer of a bid does not bind the bidder until the auctioneer brings down his hammer, which is the equivalent of accepting it. Until such time a bidder may, if he chooses, withdraw his bid. It has been laid down that the buyer of goods at an A. is not bound to perform his contract if he was the only *bond-fide* bidder at the sale, and if public note was not given of the intention of the vendor to bid. This applies even though his agent was authorised to bid only to a certain sum. This rule is to protect purchasers against the practice of employing persons to make mock biddings with a view to raising the price by their apparent competition. The acceptance of a bid is generally indicated by the auctioneer striking his rostrum with a small hammer (wooden), but sometimes lighted candles are employed to measure the time during which bids will be entertained. The length of candle gener-

ally employed is 1 in., and the last bidder before the light expires is the purchaser. Yet another method employed is the running out of sand in the sandglass. Formerly excise duties were payable on sales by A., being first imposed during the American War of Independence, in 1777. As much as £329,000 was raised by this means in one year, but in 1845 the duty was repealed. This means of raising revenue was by no means a new one, for it had been employed by the Romans, who imposed taxes on the produce of certain sales. In the reign of Augustus the duty was 2 per cent. on the produce of the sale of slaves. Under Nero it was enacted that the seller should pay the tax, from which it may be inferred that hitherto the buyer had paid it. The buyers were generally Romans, and the sellers usually foreigners. This change in the mode of paying duty was called a remission of tax, but, as Tacitus shrewdly observes, it was a remission only in name, for the tax was still paid by the purchaser in the shape of a higher price; for the vendor naturally just added the tax to the price of his goods. Under Caligula the tax was abolished altogether. In 1927 the British Parliament, feeling the need for further control of As., passed the Auctions (Bidding Agreements) Act, 1927. This was directed against the evil of the 'knock-out'; in other words, the prior agreement between a 'ring' of possible bidders that one only of their number should make a bid and that the advantage gained by this course of action should be shared by the members of the 'ring.' The Act directs that, under a penalty of £20 for non-compliance, the name and address of the auctioneer, together with a copy of the Act, shall be exhibited before and during the sale.

Auctioneer, a person whose business it is to conduct sales by auction (*q.v.*). His duty is previously to the commencement of every sale to intimate to intending purchasers the conditions under which the sales take place, but for the purposes of the Act it is considered sufficient if these conditions are posted up in the auction room. Every A. is required by the Auctioneers Act, 1845, to take out an ann. licence, which expires on July 5, and for which £10 is paid, but the same statute specifically exempts certain sales. Such sales include goods sold under a distress for rent when the amount does not exceed £20. In such cases the sale may be conducted by the bailiffs without a licence. The penalty for selling goods by auction without a licence is £100, but the lack of a licence does not render such a sale nugatory. The ordinary licence entitles the holder to act as an appraiser also, but for the sale of dutiable goods an additional licence is required. An A. has certain statutory exemptions and liabilities. Thus he is held responsible for the safe custody of goods entrusted to him for sale, and he is liable to an action for selling goods to which the person who employs him has no title, though in this matter he is afforded some relief by the Factors Act. He is debarred from purchasing for himself the property he exposes for sale. On the other hand, the A. himself has power to sue the bidder for fulfilment of contract, and has a lien on the vendor's goods for his commission and expenses. If the vendor sells the goods by private sale after the A. has unsuccessfully exposed them for sale, then the A. is entitled to a commission as if he himself had sold them. He is also not liable to the vendor for the price bid for the goods until he has received it. The number of licensed As. in the U.K. exceeds 8000, about three-quarters of whom are members of the Auctioneers' and Estate Agents' Institute (address, Lincoln's Inn Fields, London, W.C.). The Institute, which watches carefully all legislation affecting its members, was founded in 1886. In the U.S.A. there is great diversity in the laws regulating auctions, but the general principles governing them are the same as those for Great Britain. Full information on the many laws on this subject will be found in the survey, made in 1924, by the Better Business Bureau of Milwaukee, Wis., and to the Mastick-Goodrich law of New York state (1927).

Aucuba, a genus of Cornaceæ, a diœcious plant native to Asia. *A. japonica*, the Japan laurel, is cultivated in Britain as a hardy evergreen shrub.

Aude, a maritime dept. in the S. of France, is formed from part of the anct. prov. of Languedoc. It takes its name from the R. Aude, which crosses it. It is bounded on the E. by the Mediterranean, on the N. by the dept. Hérault and Tarn, on the N.W. by Haute-Garonne, on the W. by Ariège, and on the S. by the Pyrénées-Orientales. The southern portion is occupied by the spurs of the Pyrenees, reaching 4037 ft. in the Pay de Bugarach; in the N. the offsets of the Cevennes reach 4018 ft. The greater portion of the dept. lies in the valley of the lower A. The coast is very flat, no bays being found, but sev. lagoons. The soil of the plain is chiefly calcareous, but fertile, cereals, fruits, and wines being produced. Iron and mineral springs are plentiful, and wild

animals, game, and fish are abundant. The climate is warm and pleasant on the whole, but varies to a considerable extent. The manufs. of woollen and silk are of considerable value, and cereals and honey are exported. The chief tn. is Carcassonne. The area of A. is 24,485 sq. m., and pop.: French 287,052; foreign, 26,471.

Audebert, Jean Baptiste (1759–1800), an eminent Fr. artist and naturalist, was *b.* at Rochefort, and studied at Paris. Having attained a reputation as a painter of miniatures, he turned his attention to natural history, and in 1800 prod[illegible] story of the apes [illegible] in colour. Two [illegible], on the humming-birds and the birds of paradise, the latter left unfinished, were pub. after his death. He was the originator of the method of using gold-leaf to depict the plumage of birds.

Audenarde, *see* OUDENARDE.

Audenshaw, a Lancashire vil. on the L.M.S. Railway, 4 m. E. of Manchester. Pop. 7876.

Audhumla is the name of the cow by whose milk the first created being, the giant Ymir, and his race were fed. The story comes from the Scandinavian mythology.

Audians, or **Audeans**, a sect of heretics founded by Audius or Audeus, who lived in the fourth century. He attacked the clergy and the government of the church, and when he assumed the episcopal office was banished by Constantius to Scythia. The opinions and practices of Audius and his followers were: the celebra-ion of Easter after the usage of the iews; the admission of all persons in-iscriminately to the Lord's Supper; he doctrine of the eternity of fire, ater, and darkness, and especially hat of anthropomorphism, or the re-emblance of the Deity to the human rm. Information of Audius has been otained from Athanasius, Augustine, piphanius, and Theodoret, and not om Audius himself, nor his followers.

Audiffret-Pasquier, Edme Armand ston, Duc d', was *b.* in Paris in 1823. started in his political career as a porter of the Orleanist party, but r changed his views, and became adherent of the moderate Re-licans. He became president of National Assembly in 1875, and ident of the Senate in 1876. He elected a senator for life by the er body, and was the first person ceive that honour. In 1879 he chosen a member of the French emy. He *d.* in 1905.

digaune, Armand (1814–75), a olitician, was *b.* at Anciens. He ppointed a commissioner to the ission of the Universal Exhibi-of 1855. He was particularly interested in labour questions, and wrote many books and pamphlets thereon.

Audincourt is a small industrial tn. in the Fr. dept. of Doubs, and the arron. of Montbéliard. It has an iron-works and an industry in iron. Pop. 8760.

Audinot, Nicolas Niedard, an artist and dramatic author, was *b.* at Bourmont in 1732. He managed several theatres, among them the Ambigu theatre on the Boulevard St. Martin, which he built himself. He *d.* at Paris in 1801.

Audiometer, an adaptation of the telephone designed to measure the acuteness of hearing.

Audiphone, an instrument for communicating sound to the bones of the head. It consists of a plate of thin vulcanite bent and kept by strings under a certain degree of tension. The edge is placed in contact with the front teeth by which means sound is rendered audible to those whose auditory ossicles fail in their function.

Audisio, William, an It. professor and writer on theological subjects, was *b.* at Bra, in Piedmont, in 1802. His last work, *The Political and Religious Society of the Nineteenth Century*, pub. in 1876, created a sensation by its audacious views. On being requested by the pope, he made a quasi-recantation, and promised to amend some offending expressions in the next edition.

Audit Ale, a strong ale of extra quality brewed for use at Oxford and other colleges on audit day.

Audita Querela, a form of action allowed to a defendant, against whom judgment has been rendered and who is thereby in danger of an execution, by which the execution may be recalled or prevented, and damages recovered, if he can show that some matter has occurred since judgment, which amounts to a discharge. In some of the states of the U.S.A. it has been superseded by the granting of summary relief upon motion.

Auditor, a person appointed to examine the accounts of the state, a public body or corporation, a company, or of a private person, and to certify that they are correct and properly kept. The duties of an A. are those of an accountant, and are in all cases of importance performed by a professional accountant. All payments and receipts must be proved by vouchers, but they must also certify to the accuracy of balance sheets and of the statements as to revenue, etc. (*See* ACCOUNTANT.) In the Companies Act, 1900, incorporated in the Act of 1908, strict provisions are made for the appointment and remuneration of As., and their rights

and duties are clearly laid down. Before 1900 regulations as to the audit of company accounts were left to the articles of association, except in the case of joint-stock banks. The Society of Accountants and Auditors was incorporated in 1885. In the British Civil Service the Exchequer and Audit dept. plays an important part. The comptroller and auditor-general in 1866 replaced the comptroller-general of the exchequer and the commissioners for auditing the public accounts. As comptroller he authorises issues from the exchequer in accordance with accounts that have received parliamentary sanction, and authorises borrowings to meet deficiencies; he examines the daily accounts furnished by the Bank of England as to the payments paid to the exchequer account; as auditor-general he ascertains whether money expended has been applied to the purpose for which it was granted, and generally verifies the public accounts and reports to parliament. In the United States the central and state governments, together with the municipalities, have their accounts submitted to public As. The accounts of the Federal Government are audited by a comptroller-general, who is the chief official of the General Accounting Office. The comptroller-general operates through an Audit Division, which is quite independent of the executive government, being solely responsible to Congress direct. With the exception of the accounts of the Post Office, which are audited by their own auditors, the Post Office Division (co-ordinated with the Audit-Division), all the central government's accounts are submitted to the Comptroller-General's department.' The Fr. public audit dept. is styled *Cour des comptes*: the Ger. *Rechnungshof*. In Scotland, an 'A. of the court' is equivalent to the Eng. taxing-master.

Auditory Nerves, the special nerves connected with the sense of hearing. They rise from the *medulla oblongata* as the eighth pair, or, according to some anatomists, the *portio mollis* of the seventh pair, of cranial nerves, and pass downward to the ear. *See* BRAIN and EAR.

Audley is the name of a Staffordshire parish, 4½ m. N.W. of Newcastle-under-Lyme. It has an area of 8727 acres, and a pop. of 14,738.

Audley, Sir James, was one of the original knights of the Order of the Garter, which was founded in 1344 by Edward III. He greatly distinguished himself at the Battle of Poitiers, was governor of Aquitaine in 1362, and great seneschal of Poitou in 1369. He *d.* in 1369 at Fontenay-le-Comte.

Audley, Thomas (1488–1544), was an Essex man, whose precise genealogy is unknown. He is thought to have studied at Magdalene College, Cambridge. He was autumn reader in the Middle Temple in 1526. He afterwards became a member of Wolsey's household. In 1529 he became speaker of the House of Commons, and by means of his servile submission to Henry VIII., he obtained the lord chancellorship in 1533.

Audouin, Jean Victor (1797–1841), an eminent Fr. entomologist, was *b.* at Paris. He began to study law, but his strong natural inclination led him to the study of the natural sciences, and of medicine. He was made professor of entomology at the Jardin des Plantes in 1833. He made the study of insects his speciality, and wrote on this subject, and on the natural history of the coasts of France.

Audran, Edmond (1842–1901), a Fr. musical composer, was *b.* at Lyons. He was originally intended to enter the church, but his tastes were for the musical profession, and he became choir-master at Marseilles. He was first brought into the popular notice by his operetta *Grand Mogul*, which was produced in 1864. He afterwards produced a number of melodious, light, and graceful vaudevilles and comic operas, such as *La Poupée, La Cigale*, etc.

Audran, Gérard (1640–1703) *b.* at Lyons, and studied at Rome. He obtained considerable fame by his engraving of Pope Clement IX., and was appointed engraver to Louis XIV.

Audsley, George Ashdown (1838–1925), architect and writer. Born at Elgin, Scotland; lived in New York from 1892. Author of sev. works on art, including *Handbook of Christian Symbolism*, 1863; *The Art of Chromolithography: The Ornamental Arts of Japan*, 1882–6; *Ceramic Art of Japan* (with J. L. Bowes), 1875–8; and *The Art of Organ-Building*, 1903; *The Organ of the Twentieth Century*, 1920; *Organ Stops and their Artistic Registration*, 1921.

Audubon, John James (1780–1851), a celebrated American ornithologist, *b.* in Louisiana. He was educated at Paris, and studied drawing under David. His father estab. him on a plantation in Pennsylvania, and in 1808 he married the daughter of a farmer, Miss Lucy Bakewell. His ardour for the study of natural history was indomitable. Annually for fifteen years he explored the primæval forests of America, and as he was able to transfer the results of his labours to paper with a spirited hand, his works have great value. His *Birds*

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place in the Bodleian Library, of which he compiled a catalogue. In 1862 he was appointed professor of Sanskrit and comparative philology at Edinburgh; in 1875 he resigned this post for the professorship at Bonn. He brought out scholarly editions of several Sanskrit classic works.

Augarten, a fine park in the Fr. style in Vienna, Austria. It extends over 125 ac., and was opened to the public by the Emperor Joseph II. in 1775. It was formerly noted for its musical associations, concerts having been started there by Mozart in 1782.

Augeas, *see* HERCULES.

Auger, boring tool for woodwork, larger than a gimlet, akin to the drill, and of many varieties. Also for boring the soil, as the post-hole auger.

Auger, Athanase (1734–92), was a distinguished Fr. classical scholar. He early applied himself to the study of the Gk. and Rom. writers, and was appointed professor of rhetoric in the college of Rouen. Amongst his translations are those of Demosthenes and Æschines, 1777, Isocrates, 1783, Lysias, select orations of Cicero, and selections from Chrysostom and Basil. He also wrote an essay on the constitution of Rome, *De la Constitution de Rome sous les Rois et au Temps de la République*, pub. after his death as an introduction to the whole of Cicero's *Orations*, 1792–94; *Projet d'Education Publique, précédé de quelques Reflexions sur l'Assemblée Nationale*, 1789; and *Catéchisme du Citoyen Français*, 1791.

Augereau, Pierre François Charles, Duke of Castiglione (1757–1816), marshal of France, *b.* at Paris. He served in the Neapolitan army till 1787, and volunteered for the Fr. army in 1792. His conduct in Vendée and the Pyrenees was so brilliant that he was general of div. in 1793. Sent to the It. army, he highly distinguished himself at Lodi, Castiglione, and Bologna. He took part in the *coup d'état* of the eighteenth Fructidor (Sept. 4), and was a member of the Council of Five in 1799; in 1804 he was created marshal of the empire and grand officer of the Legion of Honour. He submitted to Louis XVIII. on Napoleon's abdication, and was created a peer.

Aughrim, *see* AGHRIM.

Augier, Guillaume Victor Émile (1820–89), a Fr. dramatic poet, was *b.* at Valence. He was educated as a lawyer, but soon turned his attention to literature. He tried different styles of writing for a dozen years without finding his true vein; his later dramas are in prose, which is much better suited to his talent than verse. His works may be divided into three classes: (1) plays dealing with the relations between the sexes; (2) comedies of every-day life; (3) plays dealing with social questions. He was not inclined to paradox, and was not easily influenced by chimeras, but defended the common-sense view against sophistry. He did not, however, take up the attitude of a reformer or an apostle. He had a penetrating power of observation, but was not bitter. His plays are marked by their easy action and free development of character. He was made a member of the Academy in 1858, a commander of the Legion of Honour in 1868, and died on October 28, 1889.

Augila, or Audjelah, is an ill-built, dirty tn. situated in an oasis of the desert of Barca, in 29° 18′ N. lat. and 21° 53′ E. long. It is in the track of caravans travelling between Cairo and Fezzan. The oasis of A. is under the dominion of Beylick of Benjazi, which is a prov. of the regency of Tripoli. The vils. of Mojabra and Meledila are also situated in the oasis. Though the surrounding country is flat and sandy it is well tilled and laid out in gardens.

Augite (Gk. αὐγή, lustre), an important mineral belonging to the pyroxene group, which commonly forms rocks. It is often found in volcanic rocks. It is green when in fibrous masses, black when it crystallises, and is distinguished from hornblende by its crystals, which are smaller and thicker.

Augmentation is used with special signification in heraldry, in music, and in Scottish law.

In heraldry, an additional charge to a coat-of-arms was known as an A. The right to add such a charge was conferred as a mark of honour.

In music, especially in counterpoint and fugue, A. is the name given to the repetition of the subject in tones of twice the original length.

In Scottish law, an increase of stipend obtained by a parish minister in the Court of Teinds by a process of A. against the titulars and heritors was known as an augmentation.

Augmentation. *See* BENEFICE, TEINDS.

Augmentation, Court of, a court set up by 27 Henry VIII. *c.* 27, for the purpose of managing the revenues and possessions of all monasteries under £200 a year, which by an Act of the same session had been given to the king, and for determining suits relating thereto. The origin of the title of this court is seen by referring to its full title, 'The Court of the A. of the revenues of the King's Crown.' It was a court of record, with one great seal and one privy seal. All the dissolved monasteries under the above value, except those preserved incor-

of America was praised in most enthusiastic terms by Cuvier. He was of an unassuming and deeply religious nature, handsome in form and feature, and of a keen and clear-sighted intelligence. See *Life* by Buchanan (Everyman, 601).

Aue, a Ger. industrial tn., 13 m. S.E. of Zwickau, which has a technical school connected with the tin-plate industry; pop. 19,100.

Auenbrugger von Auenbrug, Leopold (1722–1809), a physician, *b.* at Graetz in Styria. He became physician to the Spanish nation in the Imperial Hospital of Vienna. His work, entitled *Inventum Novum*, 1761, gave an account of his discovery of an application of the laws of acoustics to the investigation of the phenomena or action of the internal parts of the human body. It has been translated into Fr. by Rozière, 1770; by Corvisart, 1808; and into Eng. by Dr. Forbes of Chichester, entitled *Original Cases*, London, 1824. A. also wrote a work on madness, in Latin, 1776.

Auer, Aloys (1813–69), *b.* at Wels, in Austria. He was the inventor of 'Nature Printing by Photography,' and was director of the Imperial Printing Office at Vienna from 1841 to 1868. He printed the Lord's Prayer in over 600 languages and 200 different alphabets.

Auer, Hans (1847–1906), a Swiss architect, carried on his profession and taught in Vienna. The new federal administrative offices and houses of parliament at Bern were designed by him, and he was made professor of architecture there in 90.

Auerbach, Berthold, an eminent r. author of Heb. extraction, *b.* at rdstetten in the Black Forest in 2. He was educated at the Tall school of Hechingen, and at the rersities of Hohenasperg, Munich, Heidelberg. He was imprisoned everal months in the fortress of enasperg as a member of the ents' Burschenschaft. He origi- studied theology, but later d to law, and from law to history philosophy, making a special of Spinoza. He wrote several which contain charming de- ons of people and scenes in the Forest, and are also distin- by exact observation. His hilosophical novels, mostly ed with the evolution of the of individuals, are clever, but He *d.* in 1882.

ch's Keller, a wine cellar in rn in Grimmaische Strasse, It forms a scene in the nd, and appears in Goethe's vo sixteenth-century mural paintings of incidents in the may be seen in this cellar.

Auersberg, Anton Alexander, C of (1806–76), an Austrian poet, Laibach. He was elected a m ber for life of the Upper Hous the Austrian Reichsrath in 1861. political affairs he was distinguis by his liberalism and his Ger. le ings. It is, however, under his n *de plume* of Anastasius Grun that is best known, his humorous poe and political satires reaching a ve high standard. He *d.* at Graetz.

Auerstadt, the name of a littl Prussian vil. in the prov. of Saxony 10 m. W. of Naumburg. The Fr. army under Davout routed the Prussians with heavy loss here on Oct. 14, 1806. Pop. 600.

Auerswald, Alfred (1797–1870), a brother of Hans and Rodolphe A., a Prussian politician. He was successful in obtaining the long-promised convocation of the states of the empire; and was a member and vice-president of the second Prussian chamber. He was bitterly opposed to the politics of Manteuffel.

Auerswald, Hans Adolph Erdmann d' (1792–1848), a Prussian general. In the revolution of Sept. 1848, he was assassinated, together with Prince Lichnowsky.

Auerswald, Rodolphe (1795–1886), brother of Hans A., a Prussian statesman. He was brought up with Prince William, the future emperor. He became a member of the national assembly in 1858, but he undertook the reorganisation of the army without obtaining the sanction of the authorities, and as a consequence he lost his place in 1862, and thenceforward had no influence.

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porately, were in survey of the court, and the chancellor of the court was directed to make an annual report of their revenues to the king. The yearly revenue of 376 monasteries under £200 a year, which were suppressed, was £32,000, and the value of their goods and chattels, etc., was estimated at £100,000.

Augsburg is an historic city of Bavaria, situated at the junction of the Wertach and the Lech rivs., 37 m. W.N.W. of Munich. It was founded by Augustus in 13 B.C. and named Augusta Vindelicorum. It became the cap. of the prov. of Rhætia, but was laid waste by the Huns in the fifth century. It next came under the dominion of the Frankish kings, and in Charlemagne's war with Thassilo of Bavaria it was again destroyed. It became a free city of the empire in 1276, and reached the summit of its prosperity in the latter half of the fourteenth century. It was important, however, in the sixteenth and seventeenth centuries, though the discovery of the road to India by the Cape, and of America, caused the commerce of the world to flow through new channels and dried up the sources of A.'s prosperity. Many diets of empire were held there, and it continued to be important for commerce, manufs., and art till the war between Charles V. and the Protestant league of Schmalkald in 1540. It now presents rather a deserted and antique appearance, but has some fine streets and squares, and numerous handsome buildings. The cathedral, the work of sev. generations, was begun at the end of the tenth and finished in the fif-eenth century. The town hall, one f the most beautiful architectural nonuments of Germany, contains the amous 'golden hall,' in which public eremonies take place. Amongst her notable edifices are the church St. Ulrich, the episcopal palace, rmerly an imperial palace, the senal, etc. A. is now noted for its oollen and cotton manufs., and its ss and silver wares. Paper is also nufactured, and an extensive nking business is done, whilst there also printing works and breweries. . 162,135.

ugsburg, Confession of, was the e given to the formula, drafted Luther and modified and revised Ielancthon, which contained the ession of faith of the Protestants, which was presented by them to Emperor Charles V. at the Diet of burg in 1530. The original form adhered to by the Lutherans, altered by the Ger. Reformed hmen. The original document ted to the diet is preserved in ustrian archives.

Augsburg Interim is the name o document which Charles V. caused be drawn up by the theologians both sides, at a diet meeting Augsburg in Sept. 1547. He hop by this to restore the unity of th church, but though the Interim wa accepted by the diet, neither Roman ists nor Protestants would agree to it

Auguis, Pierre Jean Baptiste, a Fr magistrate and politician, was *b.* a Melle in 1742. He was president o the tribunal of Melle at the beginning of the Fr. Revolution. He was deputy for Deux-Sèvres in the Assembly and Convention, and was remarkable for his moderation. He was afterwards a member of the Council of Five Hundred in 1799, and of the legislative body. He *d.* in 1810.

Auguis, Pierre René, son of Pierre Jean Baptiste A., a Fr. critic, was *b.* in 1786 at Melle. He entered the marine service, but left it in order to pursue a literary career. In 1814 he was condemned to five years' imprisonment for attacking Louis XVIII. in print. He was released in 1817. In 1830 he became a deputy, in opposition to the gov., and finally accepted a post as librarian at Mazarine. He *d.* in 1846.

Augur. The Rom. college of As. foretold events and interpreted the will of the gods from various signs and omens. Such were, thunder and lightning, the flight and song of certain birds, the appetites of birds, particularly chickens, the movements and attitudes of beasts and reptiles, and incidents occurring at the moment when a magistrate performed some public act, or during an augural consultation. The answers of As., as well as the signs governing their utterances, were called 'auguria,' 'auspicia' being properly confined to divinations from birds. The political importance of the As. was very great, as nothing of any importance could be undertaken unless they were consulted, and they could postpone business at their pleasure. The number of the As. taken from the patrician class only till 307 B.C. was four until 81 B.C. In 81 B.C. the number was increased to fifteen, and Augustus elected As. as he pleased.

August. The month of A. was originally called 'Sextilis,' being the sixth month in the Alban or Lat. calendar, and which name it retained in the calendars of Romulus, Numa Pompilius, and Julius Cæsar. When Numa reformed the calendar it became the eighth month of the year. In the Alban calendar Sextilis consisted of twenty-eight days; in that of Romulus, of thirty; in that of Numa, of twenty-nine. Julius Cæsar restored it to thirty; and Augustus

during his university career at Carthage that A. formed that illegitimate connection with a young woman by whom he had a son, Adeodatus (given by God). This union, unlawful as it was, continued for some fourteen years, whilst A. was always passionately fond of his son. He had during his period of study been devotedly attached to the Latin poets and writers, although his acquaintance with Gk. was so small that it has been doubted whether he was able to read the Gk. gospel in the original. The *Hortensius* of Cicero had great influence on his career, giving him a desire for wisdom, and showing him the folly of the life he had been leading. Manichæism, the



ST. AUGUSTINE
(*By Botticelli*)

so-called Higher Christianity, was the first philosophy that he embraced. At first he set up as a teacher of grammar in his native town, but he soon returned to Carthage. His study of psychology soon led him to doubt Manichæism, and after a short stay as a tutor in Carthage, he set out for Rome, where again, after a short illness, he was disgusted with the mannerisms of the students, and left there in order to become the pro-

At Milan
definite
and for
...uence of

the philosophy of the Sceptics; but the oratory of Ambrose, Bishop of Milan, gradually drew him under its influence, and although at first it was only the oratory, later the divine message of the preacher began to have its influence also. He studied the Pauline epistles, and now he began to see the divinity of the Christian call, and he ended by retiring into seclusion and announcing himself as a candidate for baptism. The conversion of St. A. may be said to date from the summer of 386, in his thirty-third year.

He was baptised with his friend Alypius and
few days late
rejoined him,
immediately r
he remained for some time in Rome, but in 388 he returned to his native tn. Here was laid down the beginning of that rule of life which later developed into the monastic system of A., and which at this time he and a devoted band
out. He was
take a more acti
of the Christian church, but declined until about 390 he went to Hippo to visit some Christian friends, and was invited to become presbyter of Hippo, later coadjutor to the bishop, and finally bishop of the see itself. The rest of his life was taken up with the controversies which form such an important part of the influence and work of St. A. Not unnaturally his first great attack came against his first faith, Manichæism. The greatest of all these writings in his first controversy is *Contra Faustum Manichæum, i.e.* against Faustus of Milan, his old friend and associate. His second great controversy was against the Donatists. Although the doctrines of the Donatists, who took their name from a bishop of Carthage, set up as a result of the Diocletian persecutions, had been declared false by the Bishop of Rome and by the Emperor Constantine, the party had made great progress and had incited the indignation of A. He vented his wrath in seven books, *The Seven Books on Baptism*. In these and later writings A. in his wrath gave utterance
the
separ
ages

A.'s greatest controversy, however, was against the Pelagian heresy. He

found himself in bitter opposition to Pelagius and Cœlestius, who put forward the following opinions. That Adam's sin was purely personal and affected no one but himself, and that therefore man is born pure and is only corrupted by temptation and frailty,

mediately he crossed to Italy, to be greeted with the news that he had been adopted into the gens Julius, and had been appointed sole heir by the great dictator. His position was both difficult and dangerous, but he faced it with the calmness that was so characteristic of him, and which went far in obtaining for him the position he ultimately occupied.

His claims as heir of Cæsar were scornfully and lightly regarded by Marcus Antonius, Brutus, and Cassius, but nevertheless he soon began to gather round him a band of faithful followers, and he took part in the struggle which drove Antonius from Rome across the Alps. In the meantime Brutus and Cassius had dispersed to their provs., and in 43 B.C. Gaius Octavius, Antonius, and Lepidus formed a triumvirate. This triumvirate is marked by the huge proscription which took place under it. Their next move was to put down the power of Brutus and Cassius, who held, with the Republicans who had escaped the proscriptions, the E. portion of the empire, and in 42 B.C. at Philippi, Brutus and Cassius were defeated and killed. Quarrels almost immediately broke out between the successful allies, but were soon patched up by means of the marriage of Antonius to Octavia, the sister of Gaius Octavius. Sextus Pompeius, who by his successes had forced the allies to grant him the is. of the W., was next attacked and routed, Octavius bearing the brunt of the battle and being well supported by his life-long friend, Marcus Agrippa. Practically now the struggle for power lay between Antonius and Octavius. The years which elapsed between the decisive campaigns were spent by Octavius in reforms and reorganisation at home, an attempt to prove to the people that in him and him alone lay the safety and preservation of the sacred customs, institutions, and frontiers of Rome. His arms had been carried in triumph in Asia, Spain, Dalmatia, Pannonia, and Gaul. At home he had abolished the laws of the triumvirate, nd had abolished numerous abuses. radually every honour that Rome ad to offer came into his hands. The ibunician power had been granted m for life, the office of pontifex aximus became his at the death of pidus, the form of government of e Rom. republic still remained, t gradually became nothing but a dow. The boundaries of his empire e the boundaries which, if we ept the conquest of Britain, were ctically adopted by his successors. question of succession also, to- ls the end of his reign, must have a source of great grief to A. His

brilliant stepson Drusus died in 9 after proving himself a great ge and a useful administrator. Fo time he turned to his stepson Tibe but Tiberius was never a very lov man, and soon he turned to his blood relations and practically cognised his nephews, Gaius Lucius, both of whom were raised the consulship as his heirs, but A.D. 2, Lucius died on his way to command in Spain, and in the ne year died Gaius, returning wound from Armenia. A. bowed to the i evitable, and Tiberius was recognise as heir, became a colleague of th princeps, and was adopted by him a a son.

The rumour of the founding of Græco-Oriental empire, together with the discarding of Octavia by Antonius roused the feeling of Rome and led to the decisive campaign. The great Battle of Actium was fought in 31 B.C., and a year later Antony and Cleopatra died by their own hands on the fall of Alexandria (30 B.C.). His next task was the reorganisation of the Rom. empire. For the next two years he devoted himself to this task. The republic was restored, the power of the senate, the magistrates, and the assemblies was again given back. The old forms of government, with all power gained from their antiquity, again became supreme, but behind the whole fabric of the Rom. empire was the princeps covitatis, who was to safeguard the whole. Into the hands of Octavius was delivered the controlling authority, the government of the frontier, the command of army and navy, the control of the foreign affairs of the republic. Octavius had proved that he alone could restore public safety and public honour; and the compromise now arrived at was one which the craft and genius of the man make very characteristic indeed. In January 27 B.C. the senate conferred upon him the title of Augustus the Venerable, the Majestic.

The rest of this period of power is one long record of prosperity and victory, marred only by the defeat of the Rom. legions under Varus, A.D. 9, by Arminius. Everywhere else Tiberius, during the later years of A., was closely associated with him in the gov. of the empire. In A.D. 14, after a journey to Naples, A. *d.* at Nola on Aug. 19. The final act was his elevation to the number of the gods. During his period of power Rome had been practically rebuilt, he found it stone and he left it marble, while if we view A.'s reign from the point of view of literature, there are few, if any, periods to which we can compare it. The age of Horace, Virgil, Ovid, Tibullus, and Livy indeed belong to

an age which has become proverbially an Augustan age.

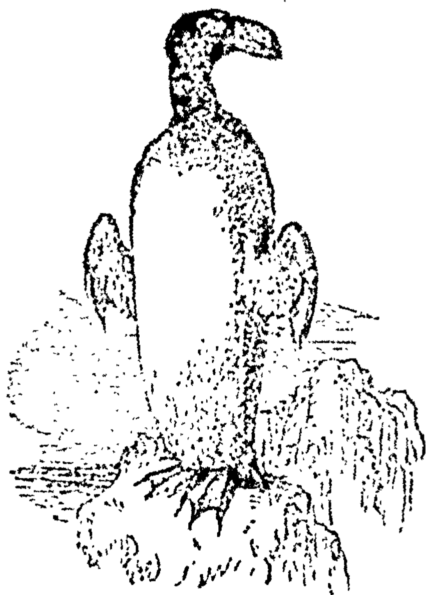
Augustus, the name of three electors of Saxony, two of whom were also kings of Poland.

Augustus I.'s (1526–86) chief title to fame was his adoption of the Calvinistic form of religion and his later conversion to Lutheranism. When he became a Lutheran he violently persecuted the Calvinists. To him is due also the founding of the great library at Dresden.

Augustus II. (1670–1733), Elector of Saxony and King of Poland. After the death of Sobieski in 1697 he became a candidate for the kingdom of Poland, which he succeeded in obtaining owing to the lack of opposition from France, whose claimant was the Prince of Conti. A. now changed the hereditary religion of his family and became a Catholic. In alliance with Russia he fought Sweden in a vain attempt to win back the provs. which Sweden had previously conquered, and also in an equally vain attempt to make his elective power as despotic as his power in his hereditary dominions. He was defeated, and in 1704 deposed, Stanislas Leczinski being elected in his place. After the Battle of Pultowa he marched into Poland with an army and regained the crown, which he kept until his death in 1733. He attempted to make his elective crown of Poland hereditary. His court was the most immoral in Europe, and of his numerous children only one was legitimate.

Augustus III., only legitimate son of A. II., Elector of Saxony and King of Poland. On his accession the War of the Polish Succession broke out. The candidates were A. and Stanislas Leczinski, the deposed king. By the help of Russia A. drove Stanislas out and became sole king in 1734. During the War of the Austrian Succession he was first against Maria Theresa, but ultimately on her side. He was defeated by Frederick the Great at the Battle of Kesseldorf, and the Treaty of Dresden was concluded. In 1756 he was driven from Saxony by Frederick the Great, whose raid found its own justification in the archives of Dresden. The Treaty of Hubertsburg of 1763 restored Saxony to him. A. III. *d.* in the same year.

Auk, a family of oceanic birds, scientifically known as the Alcidæ, belonging to the Charadriiformes, including the As. (Alca), the guillemots (Uria), and the puffins (Mormon). They have short wings, webbed feet, heavy bodies; they feed on fish, and lay their solitary egg on a rock. *A. impennis*, the great A., formerly common in Spitzbergen, has been extinct since 1844; *A. torda*, the razor-bill, most common in Labrador, is killed for its breast-feathers; *M. fratercula*, the puffin, is seen round the British coast; *U. troile*, the guillemot, visits the Scottish is. The great A. could not fly, but other As. use their wings for short distance flights and also as oars in the sea.


AUK

Aulacodus (Gk. αὖλαξ, furrow, ὀδούς, tooth), a genus of rodents of the family Octodontidæ, found in S. Africa. It is a ground-rat, about the size of a cat, and is related to the porcupine and guinea-pig.

Aulard, François Victor Alphonse, a Fr. historian and professor, was *b.* at Montbron in Charente in 1849. After being professor at Aix, Montpellier, Poitiers, and Paris, he wrote a masterly book on the Fr. Revolution, of which he had made a special study. As a result of this, he was charged to deliver a course of lectures thereon. In 1891 he was created professor to the Municipal course of Paris.

Aula Regis, a royal court of justice estab. by William the Conqueror, and developed under his successors. It had depts. for hearing various kinds of pleas; from these are descended the courts of king's bench, common pleas, and exchequer.

'Auld Lichts,' *see* PRESBYTERIANISM.

Aulic Council, a legislative and executive body, estab. by the Ger. king, Maximilian I., in 1497, to assist in governing the Holy Rom. empire.

At first its business was very wide, including every question which might come before the emperor, home or foreign, but it was afterwards restricted to affairs of the empire only. The council consisted of about twenty members, of whom six were Protestants. There was much rivalry between the council and the imperial chamber, with which it had concurrent jurisdiction.

Aulie-Ata, 'holy father,' a tn. of Russian Turk [illegible] Syr Daria; [illegible] 1864. Pop., [illegible]

Aulis, an anct. Bœotian seaport on the Euripus, famous as the starting place of the Gk. fleet for the Trojan war, also as the scene of the sacrifice of Iphigenia.

Aullagas, the name of a salt lake in Bolivia, which receives the surplus waters of Lake Titicaca through the Rio Desaguadero. As Lake A. has only one perceptible outlet, and that of inconsiderable dimensions, the destination and outlet of the surplus waters are unknown. Another name for Lake Aullagas is Lake Poopo.

Aulnoy, Marie Catherine, Baronne d' (1650–1705), Fr. author. She wrote sev. romances now forgotten, and some lively but untrustworthy memoirs, but her *Contes des Fées* have had a lasting success. She conspired against her husband, bringing a false accusation of treason; being detected she fled to Spain, but after some years was allowed to return in reward for secret services rendered to the government of Louis XIV.

Aulophite, a plant, not a parasite, that shelters within another.

Aulus, Gellius, a Lat. poet, *b.* in Africa between 125 and 130 A.D. At the age of sixteen he came to Rome to study, and among his tutors were Apollinaris and Fronto. The work by which he is best known, *Noctes Atticæ*, is a dialogue in which the most varied questions of grammar, philosophy, history, and archæology are discussed. It derives its title from the fact that it was composed at Athens and was written during the winter nights. Although the author's style is by no means free from affectations and obscurity, and the work as a whole is most pedantic in tone, it is nevertheless very valuable from the great number of references to personages and customs which are found therein.

Aumale: (1) [illegible] of Normandy, [illegible] steel, and gl[illegible] called Albemarle or Aumerle; pop. 2506. (2) A Fr. military station in Algeria, on the site of an old Rom. settlement, about 80 m. from Algiers.

Aumale, Counts and Dukes of. The co. of Aumale in Normandy was [illegible] Conqueror [illegible] of Cham-[illegible] of A. in her own right, married firstly, William de Mandeville, Earl of Essex (*d.* 1189), secondly, William de Fors (*d.* 1195), and thirdly, Baldwin de Behen (*d.* 1214). On the demise of Baldwin, Count of A. by right of his wife, the co. was claimed by William de Fors, son of Havoise by her second marriage, and was confirmed in his possession by King John. But Normandy had in the meantime been conquered by Philip Augustus, and A. was taken by the Fr. crown. The title of Earl of A. (subsequently Earl of Albemarle) was retained by William de For[illegible] on the son of Phi[illegible] passing through [illegible] into the possess[illegible] who gave it to the Duke of Maine, and subsequently it came into the hands of the Dukes of Orleans. The title of Duke of A. has been borne by the sons of Dukes of Orleans since the reign of Louis Philippe.

Aumale, Charles de Lorraine, Duc of. A violent partisan of the Guises during the religious wars in France. A leader of the league and, together with the Duke of Mayenne, leader of the Catholics on the death of Henry of Guise. Was defeated by Henry IV. at Ivry and other battles. Refusing to surrender, he fled to the Spaniards, and betrayed sev. places into their hands. Was sentenced to death but escaped. Died in exile in Brussels in 1631.

Aumale, Duc d', Henry Eugene Philippe d'Orleans, fifth son of Louis Philippe, king of France. Distinguished himself early as a soldier. Volunteered for service with the Fr. in 1870. Was refused, but subsequently became inspector-general of the army. Protested against the disenfranchisement and exile of heads of families that had reigned in France. Died in 1897.

Auncel, a kind of balance or steelyard formerly used in England. It had a movable fulcrum and fixed weight, and the finger was often used as the fulcrum, which gave great opportunity for cheating.

Aune, or **Aulne**, an old European cloth measure, connected etymologically with Lat. *ulna*, elbow. It roughly corresponded to the Eng. ell, varying from 27 to 54 in. in different localities and periods. It is still used in Switzerland, where it measures 47¼ in.

Aungerville, Richard (1281–1345), bishop, statesman, and author, was *b.* near Bury St. Edmunds, and hence known as Richard de Bury. Educated at Oxford, he became tutor to Prince

Edward of Windsor, on whose accession as Edward III., he obtained rapid advancement, being sent sev. times on embassies to the pope (then at Avignon) and the Fr. court. In 1333 he became bishop of Durham, next treasurer, and then chancellor of the realm. He is best known to posterity as an ardent book-lover and collector; his authorship of the famous *Philobiblon* is, however, disputed.

Aunis was the name of an old prov. of France, between Saintonge, Poitou, and the Atlantic. It now, together with Saintonge, forms the modern department of Charente-Inférieure.

Aupick, Jacques, a Fr. general, was *b.* at Gravelines in 1789. He was wounded at Ligny, took part in the Spanish campaign of 1823, and was made lieutenant-colonel after the taking of Algiers. He reached the rank of general of brigade in 1839, and of [illegible] in 1847. He was afterwards ambassador at Constantinople in 1848, at London in 1848, and Madrid. He was made a senator in 1853, and *d.* at Paris in 1857.

Aura, in medicine, a term applied to the sensation of heat or cold, beginning in the extremities and creeping towards the head, which precedes an epileptic fit; also, to a creeping sensation sometimes accompanying gout.

Aural Diseases, *see* Ear.

Aurangabad is the name of two places in India. The more important is a walled tn., 67 m. N.E. by N. of Ahmadnagar, and cap. of the prov. of A. It has the ruins of a palace built by Aurungzebe, and some noted caves, partly Buddhist. The trade is reviving. Pop. 36,876. A. is also the name of a vil. in the Bengal dist. of British India, 40 m. W. of Gaya. Pop. 5000.

Aurantiaceæ, a sub-order of Rutaceæ, which consists of trees and shrubs found exclusively in the temperate or tropical parts of the Old World. It contains the genus *Citrus* (*q.v.*), which includes lemons, oranges, and limes; *C. aurantium* is the sweet orange.

Auray, a Breton tn. in the dept. of Morbihan, 3 m. up the R. Auray. Famous for the annual pilgrimage to its chapel of Ste. Anne, called Le Pardon d'A. Besides having a market for agricultural produce, it carries on fishing and boat-building, and has important oyster beds. Pop. 6949.

Aure is the name of a small Fr. riv. in Normandy, in the dept. of Calvados, which, after almost disappearing in the marshes to the N.W. of Bayeux, flows to the mouth of the Vire.

Aurelia (Lat. *aurum*, gold), a genus of medusæ (*Acalephæ*) which belong to the family Ulmaridæ, and order Discomedusæ. They are found in most seas. *A. aurita* inhabits the Baltic and Pacific. Also the chrysalis of any moth or butterfly.

Aurelian Wall, a fortified wall surrounding anct. Rome, mainly built by the Emperor Aurelian in 271 A.D. and completed by Probus in 280. Its circuit of about 13 m. can still be traced, and much is in an excellent state of preservation. The wall had an average height of 50–60 ft. and a width of 12 ft. It was constructed of concrete, with brick facing, with square towers at intervals of 45 ft., and was pierced by fourteen gates.

Aurelian Way, an anct. road of Italy, which ran from the Janiculan gate at Rome northwards along the coast, through Civita Vecchia, Pisa, and Genoa to Antipolis (Antibes) in Gallia.

Aurelianus, Cælius, a physician who lived at Sicca, in Numidia, probably about the fifth century; he left some valuable translations of ancient medical treatises.

Aurelianus, Lucius Domitius, Rom. emperor. Born in Pannonia *c.* A.D. 214 of obscure family, he became a soldier and by his valour and capacity rose to the highest military rank. On the death of Claudius II. he was proclaimed emperor by the army. His reign, which lasted five years, was largely occupied with foreign wars, the most noted being that against Queen Zenobia, but he also found time for internal reforms. He was treacherously murdered by his own officers, A.D. 275.

Aurelius, Marcus Antoninus (A.D. 121–180); his original name was Marcus Annius Verus. His mother, Lucilla, was of consular rank, while his father had been raised to the rank of patrician by the Emperor Vespasian. The young Marcus was adopted by his grandfather on the death of his father, and his early moral training must have been exceedingly good, in fact, well-nigh perfect. He early attracted the attention of the Emperor Hadrian, by whom his uncle (Antoninus Pius) had been adopted on condition that he in turn adopted Marcus and Lucius Commodus, the son of the heir designate of Hadrian, who had died. In 139 the title of Cæsar was bestowed upon him, and in the following year he became a consul. He himself, in his *Meditations*, says, 'To the gods I am indebted for having good grandfathers, good parents, a good sister, good teachers, good associates, good kinsmen and friends, nearly everything good.' His education left nothing to be desired, he was brought up under the careful training of tutors, one of whom was Herodes Atticus (*q.v.*). At the early age of eleven he fell under the influence of the Stoic

philosopher and painter Diognetus, and finally abandoned the rest of his studies for philosophy and law. He adhered strictly to the tenets of the Stoic philosophy, and learned to work hard, to avoid slander, to endure misfortunes, and never to depart from his set purpose.

On the death of Antoninus Pius in 161, he became emperor, but although the name of Verus was not mentioned, he himself admitted Verus as his



MARCUS AURELIUS

partner, and bestowed upon him full powers. Verus, who led a loose and licentious life, had one virtue which probably overshadowed his vices, that of respect and deference to the judgments of Marcus Antoninus. The opening of his reign was far from propitious. At home an overflowing of the Tiber wrought disaster, in Britain the Rom. legions were in revolt to make their general emperor, in Cappadocia the Parthians annihilated one of the Rom. forces. Verus, sent to oppose the Armenians, failed hopelessly, and although the Armenian war was brought to an end, the Armenian army of Verus brought with it back to Rome a terrible disease. Many of the Roms. thought that the last days of empire had come, but through it all Marcus never abandoned hope, and always remembered the Stoic command never to give up that on which he had set his mind. In 169 Verus died, and Marcus became sole master of the Rom. empire. His work now concerned every detail of the empire. The economic reforms which were necessary, the social problems which Rome had to face, necessitated the constant attention of the emperor, and this attention never failed. His time was fully occupied, and yet in spite of poor health, he managed to work from early morning until late at night, and seem no worse for it.

In 169 he set out to quell a rising which had broken out with the Ger. tribes in Pannonia, and for the next few years his time was constantly taken up with this, until in 174 he won the victory which gave rise to the fable of the 'Thundering Legion.' In Germany he received the news of the revolt of Avidius Cassius, who had proclaimed himself emperor. At the end of three months Avidius Cassius was dead, his head had been brought to Marcus Antoninus, his family pardoned at the request of the emperor, and the rising quelled, largely owing to his unexpected clemency. In the meantime his wife, Faustina, had died. After the death of his wife A. returned to Rome, visiting Athens on the way, and enjoying in Rome a triumph for his Ger. victories. In the following year (177) he returned to take the field against the Gers., and died probably at Vienna in March of that year. The accounts of his death differ, but the probability is that he died of acute stomachic trouble. His son Commodus was with him when he died, and erected to his honour the Antonine column. A. was, of course, deified, and became recognised as one of the household gods of Rome.

In 176 had occurred a persecution of the Christians for which A. has been attacked. Christianity was to Marcus A. simply heresy, and, as heresy, was to be punished. It will be noted that he never directly ordered the persecution of the Christians, but only the persecution of heretics. A. did not understand Christianity, but only considered it as a damper to Rome and Rom. ideals. A. was the author of the *Meditations* which contain the ideals of his philosophy.

Aurelius, Victor Sextus, Rom. historian, lived in middle of the fourth century, was a favourite of the Emperor Constantius. He wrote histories of Rome before and after Augustus. Another historian of the same name continued his history of the emperors a century later.

Aurelle de Paladine, Louis Jean Baptiste d', (1804–77), a noted Fr. general. He served in Rome, Algeria, and the Crimea, and also sat in the national assembly and the senate.

Aureole a shining cloud surrounding the representation of sacred personages in Christian art. Originally confined to divine figures only, but afterwards more widely used. The A. surrounds the whole figure; a luminous ring round the head only is called a nimbus; this is also found in anct. pagan art, and is probably of mythological origin.

Aures Mts., in S. Algeria, one of the Atlas ranges; highest peak, Shelia, 7760 ft. Deep snow lies on the A. in winter. There are many fertile valleys and one considerable plain, the Medina. The rivs. mostly flow S.; some are absorbed by irrigation, others fertilise oases in the Sahara. Their largest basins are called shotts. The dist. was under Rom. rule, and its people, mostly Berbers, are of very mixed descent, showing frequent traces of fair, probably Gaulish or Vandal, ancestry. The A. were occupied in 1845 by the Fr., whose chief settlement, Batua, is near the great Rom. ruins of Lambæsis.

Aureus. The stater auræus of anct. Greece equalled 25 Attic drachmæ of silver, about £1 Eng. The first Rom. auræus, of pure gold, was struck about the close of the war with Hannibal, and was copied from Gk. models. It was worth about 16 shillings Eng. It did not become a standard coin until the time of Julius Cæsar. Later emperors debased its value.

Aurich, a tn. of Hanover, cap. of E. Friesland, on the Ems-Jade Canal, 18 m. from Emden. It has breweries and paper manufactories. Its old palace has been turned into gov. offices. Pop. 6000.

Aurichalcite (Lat. *aurum*, gold; Gk. χαλκός, copper), an amorphous, green, transparent mineral formed of hydrocarbonate of copper.

Auriole: (1) The flap of the ear, with the auditory tube. *See* EAR. (2) The name given to two cavities in the heart, leading to the ventricles. *See* HEART.

Auricula, or Primula A., is a plant of the order Primulaceæ and genus *Primula*. It has many varieties, and grows abundantly on the Swiss Alps.

Auricula (Lat. diminution of *auris*, ear), a genus of univalve-shelled molluscs, which inhabit marshes and their borders. The animals are snails of the order Pulmonala and family Auriculidæ; they are found in the warmer climates, where they feed on plants. Fossil Auriculæ are found in the Jurassic system, and the shells are long and spiral. *A. Midæ*, or Midas's ear, is found in the E. Indies.

Auriculate, a term used in botany to describe the state of a certain kind of leaf. It possesses no petiole, or leaf-stalk, and consequently is fixed directly to the stem. The vag[inal] leaf-base, which is continuous [with] the blade, is winged, and its tw[o] project on either side of the ste[m].

Auriga (Lat., the Charioteer), a constellation situated between [Per]seus and Gemini. It is repres[ented] as a man holding a bridle in his [right] hand and supporting a goat and [kids] on the left arm. Alpha Aurigæ, i[n the] body of the goat, called Capella [(or] Alioth by the Arabs), is brighter [than] the first magnitude, and by it the [con]stellation is most easily found. [The] neighbouring constellations on ei[ther] side are Perseus and Taurus, and [its] prin. stars are never below the hori[zon] in the British Isles. The mytholo[gy] of the figure is uncertain, being at[tri]buted by some to the Horus of [the] Egyptians, whilst others accord it [a] Euphratean origin. Capella is t[he] fifth brightest star in the heavens, [its] magnitude being 0·2. Its prop[er] motion has been calculated as 44″ [per] century. The spectrum of Capella [is] full of metallic lines showing a com[-] position similar to the sun. In 1900 at the Lick Observatory, Professo[r] Campbell, and at Cambridge, Pro[-] fessor Newall, found that Capella con[-] sists of two stars which revolve about one another in a period of 104 days. A new star, Nova Aurigæ, discovered with the naked eye by Dr. Anderson in 1891, then of a magnitude 4·4 and still visible to powerful telescopes, is one from which we have learned much about the various *novæ*, or new stars.

Aurigny, the old Fr. name for Alderney, the northernmost of the Channel Is.; Macaulay uses it in his poem on the Armada.

Aurillac, cap. of the dept. of Cantal, in central France, on the R. Jordanne. Its abbey was founded in the ninth century, and became one of the greatest monastic schools of France. Pope Silvester II. was *b.* at A. The present abbey dates from the seventeenth century. A. is a prosperous commercial town. Pop. 16,389.

Auriol, a manufacturing tn., with a coal-mine, in the Fr. dept. of Bouches-du-Rhône, 15 m. E.N.E. of Marseilles; pop. under 2731.

Aurispa, Giovanni (1370–1459), It. scholar of the Renaissance, patronised by Cosmo de Medici and Pope Eugenius IV. He visited Constantinople and brought away valuable MSS.

Aurlandsfjord, a branch of the Sogne Fjord (*q.v.*), on W. coast of Norway, being a winding inlet running to the S. of the main fjord.

Aurochs, the ancient wild ox of Europe, still existing in Lithuania, and a descendant of the gigantic cattle of the Pleistocene period.

Aurora, the Rom. goddess of the dawn, corresponding to the Gk. Eos.

Aurora: (1) A city of Kane co., Illinois, U.S.A., first settled in 1834; an important centre, with large railway works, iron foundries, flour and cotton mills. Pop. 46,568. (2) A town of Lawrence co., Missouri, U.S.A., near a lead and zinc mining region; manufs. iron goods. Pop. 3575. (3) A popular vil. summer resort in Cayuga co., New York. Seat of the Wells College.

Aurungzebe (1618–1707), third son of Shah Jehan, one of the Mogul emperors of Hindustan. At an early age he showed great military talent, and was entrusted by his father with the command of sev. expeditions. Shah Jehan being taken seriously ill, his eldest son, Dara, seized the throne, but by a series of crafty negotiations and manœuvres, A. made himself master, shut up Shah Jehan in prison, slaughtered his brothers, and so became sole ruler. His reign of forty-nine years, 1658–1707, was the most brilliant period of the Mogul dynasty, but his despotic gov., and especially his Mohammedan bigotry, excited intense opposition, and the latter part of his reign was greatly troubled by the princes of Rajputana and the Mahrattas under Sivaji.

Ausable Chasm, a deep gorge 2 m. long, near Ausable River, New York, noted for its beautiful scenery.

Ausgleich, the name of a treaty which governed the fiscal, financial, and commercial relations between Austria and Hungary, first concluded in 1867, and renewed in 1878, 1887, 1902, and 1907. Its chief function vas the regulation of the amount contributed by each towards the imerial exchequer, and the proportional ivision of the national debt.

Ausonians, the name by which irgil in the *Æneid* designates the alians, as though they were named ter Ausus, son of Ulysses. It is o used by Milton.

Ausonius, Decimus Magnus (A.D. –*c.* 390), a Lat. poet, son of a physin of Burdigala (Bordeaux), where received his education. He first me an advocate, but afterwards ofessor of grammar and rhetoric. vas so successful that the Em Valentinian invited him to to be the tutor of his son an. When the latter came to rone he bestowed high rewards teacher, giving him the prefecof Gaul and Italy, and afterthe consulship. At the death tian, A.D. 383, A. retired to ala. His contemporary repuseems hardly justified by his he was rather a verse maker than a poet, and his writing marred by licentiousness.

Auspices, *see* AUGUR.

Aussee, a small tn. on the R. Tr in the N.W. corner of Styria, Aus Has beautiful Alpine scenery saline springs; favourite health res Pop. 1500.

Aussig, a tn. and river-port N. Bohemia, on the Elbe, is also important railway centre; manu chemicals, glass, and textiles, a trades largely in coal, stone, a timber from the surrounding distric Suffered much during Thirty Year War and Seven Years' War. Po 39,830.

Aust Cliff is the name of a famous bone-bed, the deposits of which are usually classed with the Lias formation. A few organic remains have also been found there which appear to belong to the Keuper deposits. This has been thought sufficient evidence for removing them from the Lias classification, but the mineralogical and geological relations of the bed render this course unjustifiable.

Austell, St., is a mrkt. tn. and par. in Cornwall. The tn. is 13 m. S.E. of Truro on the Great Western Railway. The chief feature of the tn. is the beautiful Early Eng. church, which has a particularly fine Perpendicular tower. There are important china clay works and tin mines near, and large quantities of china stone are quarried in the district. Part of the parliamentary army, under the Earl of Essex, was quartered here during the civil war, shortly before the capture of Charles I. in 1644. Pop. 6347.

Austen, Charles John (1779–1852), British rear-admiral (1844). Assiste in the capture of the *Komeet*, th *Tribune*, the *Ville de l'Orient*, and th *Scipio*; was wrecked in the *Phœni* (1816); commanded the *Aurora* in the W. Indies (1826–8), being engaged in suppressing the slave trade; assisted at the bombardment of St. Jean d'Acre (1840).

Austen, Sir Francis William (1774–1865), elder brother of Jane Austen, the novelist, entered the Royal Naval Academy in 1786. Two years later he joined the *Perseverance* brig, thus commencing a long and honourable career. During the great Fr. war he was in constant service, attained post rank in 1801, and was flag-captain on the *Canopus* in 1805. In 1809, for distinguished service in the E. Indies, he was presented by the E. India Co. with £1000. From 1810 to 1814 he served chiefly in the N. Sea and Baltic. Was made K.C.B. in 1837, and admiral of the fleet in 1863.

Austen, Jane (1775–1817), one of the most famous of Eng. novelists. Her father was rector of Steventon,

near Basingstoke, in Hampshire. She was the youngest of seven children, only one other of whom was a girl. Two of her brothers were afterwards admirals. In person she was very attractive, tall and graceful. She was educated by her father, and had the advantage of a far superior education to most girls of her day.

From childhood she wrote stories, and one of her chief amusements was to tell long impromptu tales to children. For the first twenty-five years of her life she lived at Steventon. In 1801 she went with her family to Bath, and to Southampton in 1805. After the death of her father three years later she moved to Chawton, a vil. near Winchester, and it was from this place that her first novels were issued. The first one, *Sense and Sensibility*, was published in 1811, which was followed by *Pride and Prejudice* in 1813. The next year she pub. *Mansfield Park*, and two years later *Emma*. Early in the next year her health began to decline, and to be nearer proper medical treatment she went to live at Vinchester. It was found that she vas suffering from severe consumpion, and her friends were grieved to ear that it was but a question of nonths till the end. As this aproached it brought with it no deeasing mental activity, in fact it ay almost be said that it increased as the day before her death she s writing poetry. *Northanger Abbey* d *Persuasion* were pub. in 1818, e year following her death.

She may be said to have been the nder of the domestic novel, and all characters were drawn from those h whom she came in daily contact. sphere was perhaps a little ted, but in that sphere she was urpassed. She wrote of the gentleof her day, and painted them with onderful quaintness and charm. her characters 'live,' and her our is easy and spontaneous, her discrimination of life and cter shows a wonderful insight human nature.

r fine work met with the approval h critics as Sir Walter Scott, Macaulay, Southey, and Cole- In the diary of the first-named te of Jane Austen, 'That young ad a talent for describing the ements, feelings, and characters nary life which is to me the onderful I have ever met with.' acaulay went so far as to say e was nearly equal to Shaken the delineation of characters, e said of her work that 'There e world no compositions which h so near to perfection.' And stinted praise from such men our which falls to the lot of few authors, and when one thinks that her best work was done when she was a girl of twenty-two, her greatness can best be appreciated.

Austen, William (1721–1820), engraver and draughtsman, pub. political caricatures against the Fr. and in favour of Charles James Fox; also illustrations of the art of landscape sketching.

Auster, in Rom. literature, the S. or S.W. wind; referred to by Virgil in his second eclogue, l. 58.

Austerlitz, a small tn. in Moravia, near Brunn and about 80 m. N.E. of Vienna. On Dec. 2, 1805, Napoleon here won a decisive victory against the Russian and Austrian armies, capturing 15,000 prisoners and 133 guns. A few weeks later Austria concluded the humiliating peace of Pressburg.

Austin: (1) Cap. of Texas, and co. seat of Travers col., U.S.A., on the Colorado. First built and named Waterloo by American settlers in 1838, Texas being then American ter. In the next year the Texans proclaimed their independence, and chose Waterloo as their cap., re-naming it A. in honour of one of their leaders. It is now a city with large trade and manufs., a fine capitol, and a university. Pop. 53,118. (2) Austin, a tn. in Minnesota, U.S.A., has meat-packing establishments, furniture manufactures, etc. Pop. 12,276.

Austin, St., *see* AUGUSTINE.

Austin, Alfred (1835–1913), poet laureate, the son of a Leeds merchant, was *b.* at Headingley. He was educated at Stonyhurst, Oscott, and London University, graduating in 1853. He became a barrister in 1857; but within a few years turned to literature, making his first success in 1861 with a lively satirical poem, *The Season*; this being strongly attacked, he retorted with another satire on his assailants. Later he published many works in both prose and verse, including tragedies (*Savonarola* and *Flodden Field*), lyrics, poems on historical persons and events, and above all, poetry and prose descriptive of nature, the latter subject being perhaps most congenial to his muse. One of his best-known books is *The Garden that I Love*, a prose idyll. He occupied a considerable place in journalism as a leader-writer and correspondent, and was for some years editor of the *National Review*. At the death of Tennyson in 1892 every one recognised that the two greatest surviving poets were both 'impossible' for the laureateship; and the selection, which aroused much controversy, was left in abeyance until 1896, when Mr. Austin was appointed.

Austin (or Austen), Charles (1799–1874), lawyer, and brother of the celebrated jurist, John Austin (*q.v.*); was called to the bar in 1827, and became a Q.C. in 1841. As a parliamentary lawyer he acquired great wealth in the year of the railway mania, and as a consequence he retired in 1848 from the profession of law to become a country gentleman.

Austin, Horatio Thomas (1801–65), Eng. navigator and explorer, served under Parry in 1824 in his fruitless attempt to find the N.W. Passage. He distinguished himself in the Egyptian expedition of 1840. In 1850 he was appointed to the command of an expedition sent in search of Franklin.

Austin, Jane Goodwin (1831–94), American novelist, whose works deal mostly with the Pilgrim Fathers and their times. Among her works are: *Mrs. Beauchamp Brown* (1880); *A Nameless Nobleman* (1881); *The Desmond Hundred* (1882); *Standish of Standish* (1889); *David Alden's Daughter and other Stories* (1892).

Austin, John (1790–1859), the celebrated writer and authority on jurisprudence; after a short career in the army, during part of which he served in Sicily, was called to the bar in 1818. His success as a barrister was indifferent, and in 1825, his health giving way, he retired from legal practice. In 1826 he was appointed professor of jurisprudence in the newly-founded University of London, where he had s hearers such distinguished men as ohn Stuart Mill, Sir G. C. Lewis, and ord Romilly. The success of the ctures, however, was not mained, and in 1832 lack of students luced A. to resign the chair. In 33 he was appointed a member of commission on the reform of the inal law, and in 1836 a member of Maltese commission. On the latof these he distinguished himself iderably. The ten years followe spent on the Continent, return- England in 1848 in consequence e revolutionary disturbances. ectures and writings on jurisnce are distinguished by originnd power of expression, and exercised great influence on conceptions of the subject. ilosophical value of his work n disputed, but in his *Province prudence Determined*, pub. in d treating of the relation bew and ethics, his doctrine of nism is admirably presented. *ures on Jurisprudence; or, osophy of Positive Law* was pub. after his death by his Sarah Austin (*see* below). ed writings have been pub. editorship of his son-in-law, Mr. Robert Campbell, and in this f have gone through several eds. Preface by his wife to *The Provinc Jurisprudence*, 1861, and the intere ing account by John Stuart Mill his *Dissertations*. Mrs. Sarah Aust wife of the above, pub. sev. trans tions from the Fr. and Ger., includi Guizot's *English Revolution*, 185 Ranke's *Popes*, 1840, and Ranke *History of the Reformation in Ger many*. She was also the author o *Germany from 1760 to 1814* (1854), and *Letters on Girls' Schools and on the Training of Working Women*, 1857. She *d.* in 1867, at the age of 74.

Austin, Jonathan Loring (1748–1826), American diplomatist, *b.* at Boston, Mass.; entered revolutionary army in 1775 as a major, was one of General Sullivan's aides and secretary to the Massachusetts Board of War. In 1777 he went to France on diplomatic business connected with Burgoyne's defeat at Saratoga, and soon after was sent by Franklin on a secret mission to England. In 1779 he returned to the States with dispatches from the U.S. commissioners in Paris, but left the next year to attempt to negotiate loans with Spain and Holland. After 1781 he held various offices in America.

Austin, Mary Hunter, American author, *b.* Carlinville, Ill., Sept. 9, 1868. Well known in America on account of her novels dealing with the S.W. states and with the Indians, of whom she is a stout champion. Among her best books are *The Land of Little Rain*, *The Basket Woman*, *The Man Jesus* and *Lands of the Sun*. Her Indian play, *The Arrow Maker*, was produced in New York in 1911. Lectured before the Fabian Society in London, 1921.

Austin, Stephen Fuller (1790–1836), founder of the state of Texas, was the son of one of the early settlers in the dist. In 1821 he founded the settlement which is now the city of Austin. In 1834, in consequence of his attempts to secure the recognition of Texas as a separate state of the Mexican Confederacy, he was imprisoned for some months in Mexico city.

Austin, William (1587–1634), religious writer and lawyer, was the author of *Devotionis Augustinianæ Flamma, or Certayne Devout, Godly, and Learned Meditations* (1635; new ed. 1637), and *Hæc Homo, wherein the Excellency of the Creation of Woman is described by way of an Essay*, 1637. He also trans. Cicero's *Cato Major, or the Book of Old Age*.

Austin, William (1754–93), *b.* at Wotton-under-Edge, Gloucestershire, and studied at Wadham College, Oxford, where he became assistant tutor in Arabic. Removed in 1779

to London and studied medicine, becoming eventually physician to 'Bart.'s' and a leading authority on lithotomy.

Austin Friars, the name of a well-known monastery of the Augustinian order, at one time situated in Broad Street, London. It was founded in 1253 by the Earl of Hereford.

Australasia (Southern Asia). This term is sometimes used as the equivalent of Oceania, and as such indicates Australia with the neighbouring islands—Tasmania, New Zealand, New Guinea, the New Hebrides, New Caledonia—the Malay Archipelago, the Philippines, and the other islands of the Pacific. Geographically it is most frequently used to denote Australia with Tasmania, New Guinea, New Zealand, New Caledonia, and the Solomon, Bismarck, and New Hebrides groups. It is also popularly used to signify the British Australian possessions.

Australia, the one continent lying wholly in the S. hemisphere. Its position is between 10° 39′ and 39° 11½′ S., and between 113° 5′ and 153° 16′ E. Its dimensions are 2400 m. from E. to W., and 1971 m. from N. to S. Approximately the area is 2,974,581 sq. m. Its coast-line is 8850 m.

Physical.—The noticeable features of the continent of A. are: (1) its comparatively smooth outline; (2) its poverty of water communication with the interior; (3) the absence of active volcanoes and snow-topped mts.; and (4) its antiquity. In the question of age, A. claims to be one of the oldest existing land masses. Its boundaries are, on the N. the Timor Sea, the Arafura Sea, and Torres Strait; on the E. the Pacific Ocean; on the S. the Bass Strait and the Southern Ocean; and on the W. the Indian Ocean. The land surface stands at the top of a series of three terraces which rise from the ocean bed. In the Pacific the base of these foundations lies at a depth of 15,000 ft. below the sea-level. The next layer has a depth of 8000 ft. Where this terrace approaches the cost it becomes a continental shelf, and by it are connected Australia, New Guinea, and Tasmania. The continental shelf of A. is comparatively narrow, while at some points on the E. the coast descends sharply to the deepest parts of the ocean bed, providing a phenomenon rarely met with elsewhere. The Great Barrier Reef forms the edge of this shelf as it rounds the Queensland coast. Compared with other continents A. attains a mean altitude lower than them all. Generally the whole continent may be called a plateau, whose interior is depressed and barren. The E. half of the continent is occupied by a plain 500,000 sq. m. in extent.

The Australian coasts are singularly free from inlets of the sea save for those of the N. coast. Here the Gulf of Carpentaria forms the chief bay of the entire coast. To the W. of this is Van Diemen's Gulf, of less extent but greater advantage, for it is protected from the violence of the sea by Melville Is. Beyond are Queen's Channel and Cambridge Is. Indentations are more frequent on the N.W. and include Admiralty Gulf, Collier Bay, and King Sound. The only bays on the coast of W. A. are Exmouth Gulf and Shark's Bay. This scarcity is characteristic of the rest of the coast, the exceptions being Spencer Gulf, Gulf of St. Vincent, and Port Phillip on the S., and Moreton Bay, Hervey Bay, and Broad Sound on the E. Those harbours, spacious enough to mention, are noted under the various states in which they are situated. The most interesting and most prominent feature of the Australian coasts is the Great Barrier Reef. Of all coral reefs it is the greatest, its length being 1200 m. The openings that break its continuity are found opposite the riv. mouths, and a theory is advanced that the gaps have been worn by the fresh water thus reaching the reef. A more reliable cause, however, is that of subsidence, as the distance from the mainland of the breaks is from 30 to 90 m. Tasmania is the only important is. belonging to A., those of New Guinea, Timor, etc., belonging to other systems. Off the W. coast are numberless small is., but none of any commercial significance. On the E. are a few, but again relatively unimportant is., while in Bass Strait are The Flinders and the Clarke Is., and others of small size and less importance. At the entrance of St. Vincent Gulf is Kangaroo Is., one of the largest is. of the Australian coast. On the N. are Melville and Bathurst Isles, while in the Gulf of Carpentaria, among numerous small ones, is Groote Eylandt. The mts. of A. may be classed into the E. Corderilla group, the central mts., and those of the W. With the E. Corderilla are comprised the Great Dividing Range, running parallel with the E. shore, and its spur the Bellenden Ker Range, in Queensland; the New England and Liverpool ranges and Blue Mts., in N.S. Wales; and the Australian Alps, Pyrenees, and Grampians, in Victoria. The central mts. are the Lofty Flinders and the Gawler in the S.; the Macdonnell and Musgrave in the centre; and those of Murchison and Ashburton in the N. The W.

mts. include the ranges of the Darling, Roe, and Stirling in the S.W., and King Leopold Range in the N. The highest point of the continent is Mt. Townsend, 7350 ft., in the Australian Alps, N.S. Wales. Others, which are among the most prominent, are Mueller's Peak, formerly supposed to be highest, and only a few feet below Townsend, in the same group, Mt. William, 3827 ft., in the Grampians (Victoria), with Boyong 6508 ft., Feathertop 6303 ft., and Hotham 6100 ft. in the Australian Alps. Mt. Sea View 6000 ft. and Ben Lomond 5000 ft. in N.S. Wales; Wooroonooran 5400 ft., Sophia and Dalrymple, both 4200 ft., in Queensland; Mt.

and steam. It has been estimated that this combustion has been active for 800 years.

The coastal region, save for the country round the Bight and Spencer Gulf, is well watered. In the E. coast, flowing into the Pacific Ocean, are many large rivs., but the majority have short and rapid courses. Of the [illegible] carry a large amount of fresh water even in the driest season. Second in size is the Fitzroy, flowing into Keppel Bay. The Brisbane R. empties into Moreton Bay, and owes its import-



HAWKESBURY RIVER BRIDGE, NEW SOUTH WALES

Remarkable and Mt. Brown, each 3100 ft., and Mt. Lofty in S. Australia; Mt. Barrett and Mt. William 3000 ft., Kegenerup 3500 ft., and Ellen's Peak 3420 ft. in W. Australia; Cradle Mt. 5000 ft. in Tasmania.

It is only within recent times, *geologically speaking*, that volcanic absence has been a characteristic of A. On some of the mts. in W. Victoria the cones are quite intact and beds of scoriæ have not yet been affected by denudation. Towards the Tertiary age, large beds of lava have been poured from several points of the Great Dividing Range, and it is worthy of note that volcanic action was confined to a wide region parallel to the coast. [illegible] in [illegible] is [illegible] volcano, it fulfils the erroneous description sometimes applied to one. It is, in fact, a 'burning mountain.' Its state of chronic combustion is caused by the burning of coal underground, resulting in a lavish expulsion of smoke

ance to the tn. of Brisbane on its banks. There are several important rivs. in N.S. Wales, of which the largest is the Hunter, whose course is 200 m. In order of position, from N. to S. the others are: Richmond, [illegible] into the sea at Encounter Bay, in S. A. The only other rivs. in S. A. are the Torrens and Gawler, neither of which is of much importance. In the S.W. coast are no rivs. of any length, but the Swan is of some importance, at whose mouth Perth, the cap. of W. A. is situated. The prin. rivs. between the Swan and the N.W. Cape are Greenough, Murchison, and Gascoyne; on the N.W. coast Ash-

burton, Fortescue, and De Grey, and in the Kimberley dist. the Fitzroy, Panton, Prince Regent, and Ord. There are several navigable rivs. in the N. ter. The Victoria is navigable for about 40 m. for large vessels, and 120 for small. The Fitzmaurice, a large stream, discharges itself into the estuary of the Victoria. The Daly, in its upper course, the Katherine, is navigable for some considerable distance; the Adelaide is navigable for about 40 m. The S. Alligator is navigable for over 30 m. and flows into Van Diemen's Gulf. Other smaller rivs. have their mouths on the N. coast, while on the W. of the Gulf of Carpentaria is the mouth of the Roper, a large riv. navigable for 80 m. by the largest vessels. Amongst the rivs. that discharge their waters from the coast of Queensland into the Gulf of Carpentaria are the Norman, Flinders, Leichhardt, Albert, and Gregory on the S. shore, and Batavia, Archey Colewan, Mitchell, Staaten, and Gilbert on the E. Those rivs. draining the country round the Gulf of Carpentaria are sub-tropical in character. The Darling, one of the longest rivs. of the world, is navigable for small steamers for 1800 m. above its junction with the Murray.

A noteworthy feature of the interior is the lake region. The extent of the lakes varies with the advent and retirement of the rainy seasons. Their waters are brackish, and during the dry season nothing is seen but salt-encrusted marshes. The largest of the series is Lake Torrens, with a length during flood of 100 m.

Central A. is prolific in its store of subterranean water. In 1880 the first well was bored in the W. of N.S. Wales. Two years later it was concluded that a deep artesian basin lay in the W. of Queensland. At 1645 ft. below the surface water was reached, and 291,000 gallons a day was discharged. This was the first of the artesian wells. The deepest well is that of Whitewood, 5046 ft. deep. The water is forced to the surface by hydrostatic pressure of accumulated water at a higher level.

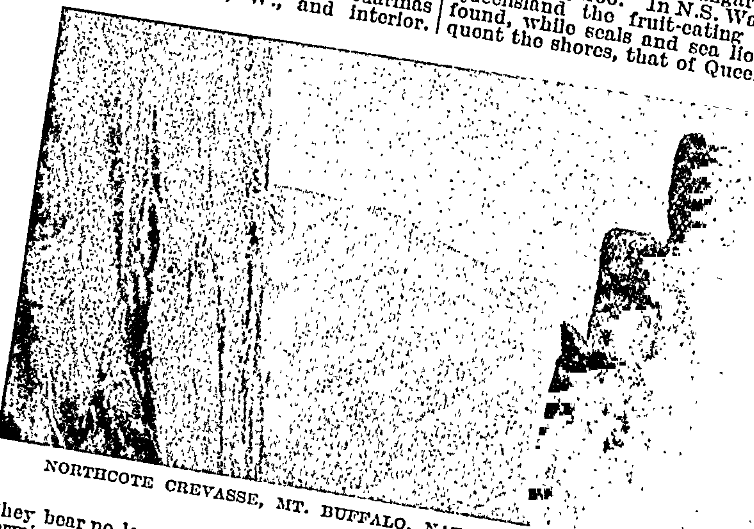
The climate of A. would be expected to vary considerably, owing to its great size. This, however, is less the case than in other continents. Its distance from the Antarctic circle and the equator, and enormous absorption of heat by day causing its radiation by night, in the great plains, form powerful factors in determining the uniformity of the climatic conditions. The fierce heat of the day causes two-fifths of the surface of A. to receive less than 10 in. of rain throughout the year. Whatever vapour masses are formed remain in that condition owing to the absence of any condensing medium. But the remainder of the continent may be said to enjoy a fairly good supply. The N.W. coast is subject to a tropical downpour from December to March, while the remaining coasts enjoy a mean rainfall of 50 in. in the E., much less in the S., being on an average 24 in., while part of the S. and W. coasts only attain 10 in. to 20 in. The visitations of drought prove ruinous to many farmers and cattle-breeders, and this feature of uncertainty of rainfall constitutes a never entirely absent menace to colonists. In 1884 a drought destroyed 10,000,000 sheep, and all the rivs. with the exception of the Murray proper shrunk to insignificance. Again, the return of the rainy season, coming with its tempestuous floods, causes an almost equal destruction of life and property by means of the floods which the swollen rivs bring about. All that can be done in the matter of irrigation to lessen the unreliability is in operation, and irrigation colonies are in existence on the Murray.

Geologically, A. seems to consist chiefly of Palæozoic and Cainozoic or Tertiary formations, though Mesozoic or Secondary deposits have been revealed. The Grampians, Pyrenees, Great Dividing Range, Australian Alps, in Victoria; the Blue Mts. in N.S. Wales; the Dividing Range in Queensland, consist chiefly of Silurian strata interrupted here and there by granite, syenite, etc. This Silurian character also dominates S. A. A large area to the S. and W. of W. A. shows igneous rocks, while traces of Palæozoic elements are found in the Darling Range. There are no Carboniferous rocks at present known in S. and W. A. Metamorphic rocks occur at intervals in Queensland and in the N.W. of Arnhem land. In N.S. Wales and the S.E. of Victoria sandstone is found among the older substances. A huge area of the continent abounds in Tertiary deposits stated to be Pliocene. These formations include the desert sandstone, coral limestone, and to a large extent the conglomerates and clays of the gold diggings. [illegible] of gold were [illegible] alluvia. [illegible] in the upper Macquarie and Upper Murrumbidgee rivs., and they are rich in fossils which supply an illuminating knowledge upon the past fauna of A.

The botany of A. contains many characteristics both unique and phenomenal. Its species number many more than are found in all Europe. A feature of the trees growing on the coast highlands is their uniformity of shade. This is a dark olive, and is

observed on both the upper and under surface alike. Their foliage extends in a vertical direction, and hence there is a great increase in the amount of available sunlight. In large and monotonous areas is the 'scrub,' a plant of dismal and unbroken appearance. It contains, however, one agreeable type, that of the tea-tree, a flowering shrub and a species of the Melaleuca. This is found in nearly every part of the continent. The forests contain many giants, among which is the gum tree attaining a height of 250 ft., with a girth of 12 to 20 ft., while in the Dandenong Range there are many trees over 420 ft. high. The valuable shea-oaks, beef-woods, or Casuarinas frequent the S., W., and interior.

Scotch thistle, from its readine
develop, has caused the diff
municipalities much expense in it
termination.
But if the flora of A. pres
strange characteristics, the zoolog
even more striking. The mamma
other lands are absent to a remarka
degree, while the pouch-bear
animals, here so prolific, are only
presented elsewhere by the opossu
of America. Of these marsupials t
largest is the kangaroo, which attai
a height of 5 ft. Other varieties a
the wallaby, the hare kangaroo, an
the rat kangaroo. In N.S. Wales an
Queensland the fruit-eating bat f
found, while seals and sea lions fre
quent the shores, that of Queensland



NORTHCOTE CREVASSE, MT. BUFFALO, NATIONAL PARK, VICTORIA

hey bear no leaves and have at the
rmination of their branches rigid
rooping 'tails.' The jarrah, or
van R. mahogany, through its
wer to resist the attack of the white
t, is used for railway sleepers and
es. The most interesting feature
he acacia. It is represented by
species, and with their striking
ow blossoms and fragrance pro-
a great source of beauty. Here
there are spots most luxuriantly
tated. Palms, Indian figs,
ers, ferns, flame trees combine
rm a harmony of colour. The
tree is so named from the effect
esents when in blossom. Its
rs of red flowers, indeed, are
ently conspicuous on the mts.
s a signal to ships miles out at
Many European trees have been
fully introduced, and the

being plentiful in the dugong or sea-cow. Phalangers are nocturnal animals, feeding on leaves and inhabiting the hollows of trees. Flying opossums may be seen at night-time, while the flying mouse, of extraordinarily minute dimensions, is a feature of the continent. Other animals include the tarsipes, a honey-sucker, the wombat, 3 ft. high, a root and grass feeder, native cats, also marsupials and carnivores, the ant-eater of W. A. and the platypus. This last has no teeth, being provided with two flat, horny projections, and possessed of broad, webbed feet. The introduction of European creatures has proved only too successful. The prolific increase of the rabbit and sparrow has involved the gov. in enormous expense in the attempted suppression of the now-recognised

vermin. Originally introduced for the purposes of exploration, the camel is now used with great profit in outlying districts as a beast of burden. Australian birds excel those of more temperate lands in beauty of plumage and form. Those specially famous for their beauty are the parrot, cockatoo, regent-bird, rifle-bird, fly-catcher, and lyre bird. A scarcity of fruit and an abundance of flowers cause the prevalence of flower-eating birds, among which are the varieties Meliphagidæ and Trichoglossidæ. The emu and cassowary belong to the same family as the ostrich of Asia and Africa. A strange and unsightly bird is the podargi, commonly known as 'more pork,' from its queer cry. There are altogether 650 different species of Australian birds, while Europe can only boast 500. There are many snakes, and though the viper is unknown, the Elapidæ (which includes the Indian cobra) comprises the majority of Australian snakes. Though all are venomous, only five kinds are fatally so.

The aborigines of A. may have come from the Malay Peninsula, driven thence by wilder and fiercer tribes. They were probably the most backward, in some respects, of any of the aboriginal tribes. They were entirely a hunting race, and had not developed on the agricultural side at all. But at the same time they had developed a system highly satisfactory to themselves by making each man responsible for a certain amount of supplies. They developed also a highly graduated language, to which a considerable grammar attached itself. The aborgines of A. are coffee-coloured, and quite separate from other coloured races, and though their height is that of a European, their stature is very inferior. Apart from the ordinary application to the human senses, the intellect of the aborigine is little developed. Certainly in tracking and running down prey he is unsurpassed. Attempts at the portrayal of sharks and other creatures are very crude. Beyond the manuf. of primitive weapons and domestic articles, he does nothing. Marital relations are most elementary. His wife is valued as property like his club and spear. Her appearance is generally marked by the wounds received as punishment for supplying insufficient vegetable food, for this is her part of the contract. Among their weapons is the boomerang. This is a curved stick which is thrown with sufficient dexterity to ensure its return to the thrower. Outside the family rule there is no law whatever, and as for religion their only inclinations towards the supernatural are contained in dread of ghosts and demons. Their life is necessarily nomadic, as they are insufficiently intelligent to practise thrift, and hence abandon a locality as soon as its resources are exhausted. Civilisation of course has caused their rapid disappearance, and while few are to be seen working as stock-men on farms, most follow their original mode of existence.

A. is politically divided into five states, and these, together with the Is. of Tasmania, form the Australian Commonwealth. Added to these are the *Territories* of North A. (cap. Darwin), Central A. (cap. Alice Springs) and Federal Capital Territory (Canberra). The pop. of the whole Commonwealth in 1911 was 4,455,005, which showed an increase of about 700,000 during the preceding ten years. The pop. according to the census of 1921 was 5,435,734, or 980,700 increase during the preceding decade, and the estimated figure for March 31, 1929, was 6,536,770, which maintains the rate of increase of the previous decade. At the end of 1929 the pop. was estimated at 6,414,373 (3,147,021 females), an increase of 77,587 over 1928. The rapid increase has been due mainly to natural expansion, by which is meant the excess of births over deaths. Immigration since 1891 has been comparatively slight. The above pop. is exclusive of aborigines, who may be estimated at 120,000. The total white pop. was made up (1929) of:

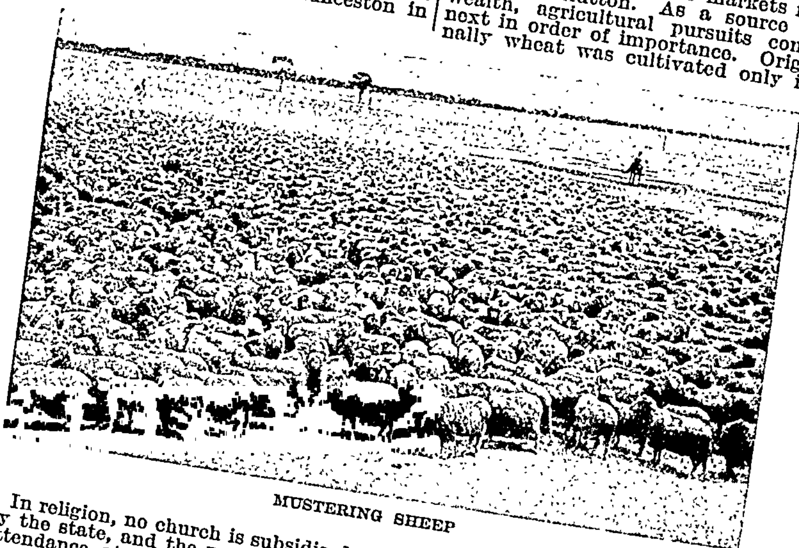
New S. Wales	2,457,127
Victoria	1,706,378
S. Australia and N. Ter.	579,665
W. Australia	408,486
Tasmania	213,486
Queensland	919,251
North Australia and Central Australia	4,024
Fed. Cap. Territory	8,358
Total	6,296,775

The area of the different states and Territories is:

	sq. m.
New S. Wales (inclus. of Federal Territory)	310,372
Queensland	670,500
S. Australia	380,070
Tasmania	26,215
Victoria	87,884
W. Australia	975,920
North Territ. and Central Austr.	523,620
Total	2,974,581

Four of the Australian cities contain a pop. of over 100,000, and there are fifteen whose inhabs. number over 10,000. The chief cities are Sydney, 1,127,470, Newcastle, Broken Hill, Parramatta, Goulburn, Maitland, Bathurst, Orange, Lithgow, Tamworth, Grafton, Wagga, and Albury, in N.S. Wales; Melbourne, 1,000,000, Ballarat, Bendigo, Geelong, Eaglehawk, Warrnambool, Castlemaine, and Stawell in Victoria; Brisbane, 263,711, Rockhampton, Maryborough, Townsville, Gympie, Ipswich, and Toowomba in Queensland; Adelaide, 330,217, Port Adelaide, and Port Pirie in S. A.; Perth, 196,251, Fremantle, and Kalgoorlie in W. A., and Hobart, 56,000, and Launceston in Tasmania.

a huge natural pasture, equipped natural advantages for the grow wool. Of the world's sheep, of A. represent one-sixth, and value of the wool export has reac in fifty years, the colossal am figure (1928) of £56,500,000. C pared with the wool industry, tha cattle and horse-breeding are of les importance, though there are pos bilities of extensive increase in t oversea trade. In dairy produce t assistance of improved methods of r frigeration in water carriage has give the trade great impetus, and ha materially extended the markets fo beef and mutton. As a source o wealth, agricultural pursuits come next in order of importance. Originally wheat was cultivated only in



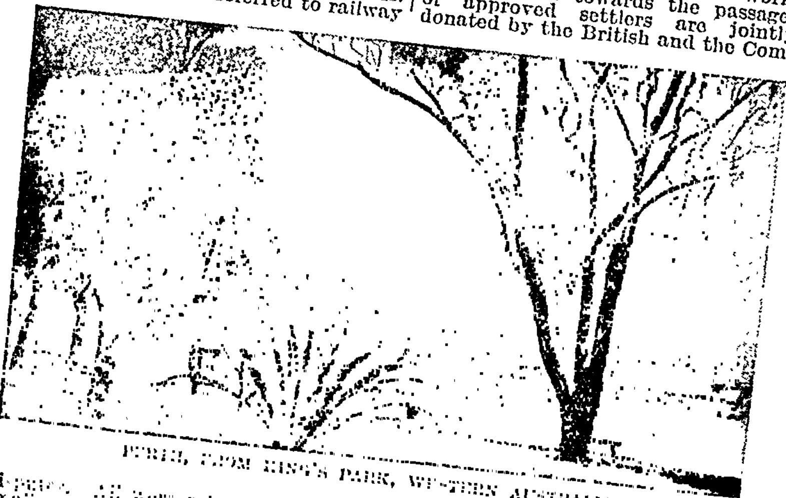
MUSTERING SHEEP

In religion, no church is subsidised y the state, and the percentages of tendance at those of the various enominations are roughly as follow: urch of England 39 per cent., oman Catholic Church 22 per cent., esleyans and other Methodists 12 cent., Presbyterians 11 per cent., ngregationalists 2 per cent., and ptists 2 per cent.
While the actual ages of compul- attendance at school vary, each e has a system of compulsory ation. At Sydney, Melbourne, aide, and Hobart are public ersities.
the continent is fundamentally pastoral nature, products of the and herds form the chief ele- of Australian commerce. A rawn along meridian 145° en- with the Great Dividing Range

the coastal strips, but experiments further inland within the 20 to 40 in. rainfall dist. have been attended with much success. Within the last seven years the value of wheat and flour export has more than doubled itself. In 1910 it was represented by over £11,000,000, and in 1925–6 the total value of the agricul. production was £89,267,000. Other important crops include maize, oats, hay, potatoes, sugar cane, and wine. The chief wheat dists. are in Victoria, S. A. and N.S. Wales. Maize and sugar cane are cultivated in N.S. Wales and Queensland, while the vine is grown in all the states. Fruit is both large in quantity and rich in variety and quality, the prin. kinds exported being oranges, pine-apples, bananas, and apples. Timber forms a valuable asset in contributing to the

directly elected by the people of the state, operates for six years. Next is the House of Representatives, which consists of seventy-five members elected for three years by the commonwealth. The governor-general has seven ministers.

The Commonwealth Constitution.—Efforts have been made to alter the Constitution of 1900, but resolutions for that purpose submitted to a referendum have generally been rejected. In the 1913 election six questions were submitted, all but one being repetitions of old proposals to extend the legislative powers of the Commonwealth Parliament over Trade, Commerce, Industrial Matters, Monopolies, Trusts and Corporations. The new proposal referred to railway



PERTH, FROM KING'S PARK, WESTERN AUSTRALIA

[illegible] rejected, but by [illegible] than previously. n 1926 a referendum was taken to ter the Constitution so as to give der legislative powers in regard to dustry and commerce, and essential rvices, but in both cases the elecrate decided against the proposals. e inference is that the individual tes are in no mind to give the mmonwealth over-riding powers, ecially in regard to trades disputes.

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Immigration.—In 1920 an arrangement was arrived at between the Commonwealth and State Governments under which the Commonwealth is responsible for the recruiting of immigrants abroad and for their transport to A.; the function of the State Governments is to advise the Commonwealth as to the numbers and classes of immigrants they are prepared to receive. The Commonwealth undertakes all publicity and propaganda in connexion with the encouragement of immigration, and the State Government finds the work. Contributions towards the passages of approved settlers are jointly donated by the British and the Commonwealth Governments. In 1925 the two Governments entered into an agreement to make available to the various States Governments loans at a very low rate of interest, to enable land to be made available for settlement or such public works to be carried out as may tend to develop settlement areas and so attract a greater pop. The maximum amount of loan moneys provided for is £34,000,000. If full advantage is taken of this offer, 450,000 new settlers must be absorbed over a period of ten years. The success of this agreement, under which about £9,000,000 had been lent up to 1930, depends almost entirely on the continuance of the policy of assisted migration which was suspended in 1929–30. At present the Imperial Government still contributes money under the agreement, particularly on schemes for intensive

development, irrespectively of the reciprocal obligation of absorption of settlers. The total number of assisted immigrants for the eleven years 1914–24 was 939,472, the average for the last few years being 25,000.

Discovery and Exploration of Australia.—The actual date of the discovery of A. is doubtful. Various claims are made, among them being the sighting of W. A. in 1522 by Magellan's followers. In 1598 it was mentioned in a book by Cornelius Wytfliet. Torres Strait refers to a visit there by Torres in 1606, while Ovik Hartog Is. recalls Ovik Hartog in 1616. In 1618 a Dutch vessel *Arnhem* explored the coast of Arnhem peninsula. As far as known the first British sight of A. took place in 1688, when Dampier gave his name to an archipelago in the N.W. In 1770 Captain Cook, during a circumnavigation of the globe, explored the entire E. coast from Gipp's Land in Victoria to Cape York. In 1790 Surgeon Bass gave his name to Bass Strait, and in 1792 Lieutenant Flinders named a range of mts. in S. A. and also a riv. discharging into the Gulf of Carpentaria. The exploration of the whole coast was completed by Darwin in the *Beagle* in 1837–43. In 1788 the first British settlement was made at Port Jackson (where Sydney now stands). Brisbane R. was opened up next by Oxley, and in 1824 Hamilton Hume reached the Murrumbidgee. Five years later he travelled from Sydney to Port Phillip, crossing the Upper Murray on the way. The exploration of the Murrumbidgee to its junction with the Murray, and the Macquarie to its junction with the Darling, followed. In 1839 E. J. Eyre (subsequently governor of Jamaica) iscovered Lake Torrens, and in the llowing year accomplished the perilus and distressing but successful at of a march of 1209 m. from delaide to King George's Sound. ve years later Captain Sturt started m the Darling and reached a point er many privations within 150 m. the centre of the continent. Of Australian attempts at exploration of the finest was the passage ss the entire continent from N. to It started from Adelaide to a e to the W. of Chambers Bay in , and was undertaken so successby J. M'Donall Stuart. Pracy at the same time another exon under Burke and Wills emd. The result unhappily was different. They started from urne, and at Cooper's Creek oned the bulk of their elaborate ment. They advanced alone, ached the Gulf of Carpentaria e mouth of the Flinders. Returning, they died of starvati Cooper's Creek. With the obj searching for the missing expl McKinley crossed the contine the Albert R. and proceeded th to Burdekin R., travelling eastw to Port Denison in Queensland. m. of the N.W. coast were explored F. T. Gregory in 1861. Attem were encouraged to the W. coast the installation of the telegraph in 1872, and Giles started from Cha bers Pillar, but in spite of despera determination only reached 100 m. the N. of Lake Amadeus. Later, 1873–4, he started 200 m. farther S and this time reached half-way acros to the W. coast. At the same tim Col. Warburton started from a plac called Alice Springs, just N. of the tropic, and with the aid of camels arrived at the R. Oakover in W. A. In 1874 John Forrest, using only horses, reached the wire just to the N. of Peake Station, from Murchison R. on the W. coast. In the next year Giles crossed from the head of St. Vincent Gulf to Perth, having experienced in his crossing of 2500 m. country altogether unfit for settlement. In fact for over 1000 m. he had a chronic struggle with that stubborn difficulty, the Australian scrub. The first settlement was made at Botany Bay in 1788, consisting of over a thousand convicts. Moreton Bay, in 1825, was adopted as a settlement, and in 1859 had risen to the position of a separate colony. Queensland now occupies the original site. In 1829 the Swan R. settlement took place in what is now W. A. From 1851–89 it was a penal settlement. Port Phillip was first colonised in 1835. It is now Victoria. British colonisation of S. A. dates from 1836.

History of Australian Settlement.—The first settlements by white men seem to have been made about the middle of the sixteenth century, so that probably for thousands of years the aboriginal tribes had occupied the whole of the continent. The Portuguese were constantly sending out exploring parties to discover this unknown world, but the Spaniards especially from their settlements on the western coast of S. America sent out their expeditions too. Some of these explorers actually sailed within sight of the coasts of Australia, yet failed to recognise the existence of a now continent; but it was in the faith established by the explorers of this period that the continent of Australia existed in the theories of the geographers for the following two centuries. Following on the explorations by the Spaniards and Portuguese came the explorations by the Dutch. From the E. Indian

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The New Capital.—Up to 1927 the Commonwealth Parliament sat in Melbourne in the State Parliamentary buildings, the Victoria Parliament occupying the Exhibition building. The site for the capital, which under the Constitution must be not less than 100 m. from Sydney, was fixed in 1908 at Canberra. The first meeting of the Federal Parliament at Canberra was held in 1927 the inauguration ceremony being performed by the Duke of York.

Immigration.—In 1920 an arrangement was arrived at between the Commonwealth and State Govern-[illegible]

State Governments is to advise the Commonwealth as to the numbers and classes of immigrants they are prepared to receive. The Commonwealth undertakes all publicity and propaganda in connexion with the encouragement of immigration, and the State Government finds the work. Contributions towards the passages of approved settlers are jointly donated by the British and the Commonwealth Governments. In 1925 the two Governments entered into an agreement to make available to the various States Governments loans at a very low rate of interest, to enable land to be made available for settlement or such public works to be carried out as may tend to develop settlement areas and so attract a greater pop. The maximum amount of loan moneys provided for is £34,000,000. If full advantage is taken of this offer, 450,000 new settlers must be absorbed over a period of ten years. The success of this agreement, under which about £9,000,000 had been lent up to 1930, depends almost entirely on the continuance of the policy of assisted migration which [illegible] At present [illegible] still con- [illegible] agreement, particularly on schemes for intensive



PERTH, FROM KING'S PARK, WESTERN AUSTRALIA

development, irrespectively of the reciprocal obligation of absorption of settlers. The total number of assisted immigrants for the eleven years 1914–24 was 939,472, the average for the last few years being 25,000.

Discovery and Exploration of Australia.—The actual date of the discovery of A. is doubtful. Various claims are made, among them being the sighting of W. A. in 1522 by Magellan's followers. In 1598 it was mentioned in a book by Cornelius Wytfliet. Torres Strait refers to a visit there by Torres in 1606, while Ovik Hartog Is. recalls Ovik Hartog in 1616. In 1618 a Dutch vessel *Arnhem* explored the coast of Arnhem peninsula. As far as known the first British sight of A. took place in 1688, when Dampier gave his name to an archipelago in the N.W. In 1770 Captain Cook, during a circumnavigation of the globe, explored the entire E. coast from Gipp's Land in Victoria to Cape York. In 1790 Surgeon Bass gave his name to Bass Strait, and in 1792 Lieutenant Flinders named a range of mts. in S. A. and also a riv. discharging into the Gulf of Carpentaria. The exploration of the whole coast was completed by Darwin in the *Beagle* in 1837–43. In 1788 the first British settlement was made at Port Jackson (where Sydney now stands). Brisbane R. was opened up next by Oxley, and in 1824 Hamilton Hume reached the Murrumbidgee. Five years later he travelled from Sydney to Port Phillip, crossing the Upper Murray on the way. The exploration of the Murrumbidgee to its junction with the Murray, and the Macquarie to its junction with the Darling, followed. In 1839 E. J. Eyre (subsequently governor of Jamaica) discovered Lake Torrens, and in the following year accomplished the perilous and distressing but successful feat of a march of 1209 m. from Adelaide to King George's Sound. Five years later Captain Sturt started from the Darling and reached a point after many privations within 150 m. of the centre of the continent. Of all Australian attempts at exploration one of the finest was the passage across the entire continent from N. to S. It started from Adelaide to a place to the W. of Chambers Bay in 1862, and was undertaken so successfully by J. M'Donall Stuart. Practically at the same time another expedition under Burke and Wills embarked. The result unhappily was very different. They started from Melbourne, and at Cooper's Creek abandoned the bulk of their elaborate equipment. They advanced alone, and reached the Gulf of Carpentaria near the mouth of the Flinders. Returning, they died of starvation at Cooper's Creek. With the object of searching for the missing explorers, McKinley crossed the continent to the Albert R. and proceeded thence to Burdekin R., travelling eastwards to Port Denison in Queensland. 800 m. of the N.W. coast were explored by F. T. Gregory in 1861. Attempts were encouraged to the W. coast by the installation of the telegraph line in 1872, and Giles started from Chambers Pillar, but in spite of desperate determination only reached 100 m. to the N. of Lake Amadeus. Later, in 1873–4, he started 200 m. farther S., and this time reached half-way across to the W. coast. At the same time Col. Warburton started from a place called Alice Springs, just N. of the tropic, and with the aid of camels arrived at the R. Oakover in W. A. In 1874 John Forrest, using only horses, reached the wire just to the N. of Peake Station, from Murchison R. on the W. coast. In the next year Giles crossed from the head of St. Vincent Gulf to Perth, having experienced in his crossing of 2500 m. country altogether unfit for settlement. In fact for over 1000 m. he had a chronic struggle with that stubborn difficulty, the Australian scrub. The first settlement was made at Botany Bay in 1788, consisting of over a thousand convicts. Moreton Bay, in 1825, was adopted as a settlement, and in 1859 had risen to the position of a separate colony. Queensland now occupies the original site. In 1829 the Swan R. settlement took place in what is now W. A. From 1851–89 it was a penal settlement. Port Phillip was first colonised in 1835. It is now Victoria. British colonisation of S. A. dates from 1836.

History of Australian Settlement.—The first settlements by white men seem to have been made about the middle of the sixteenth century, so that probably for thousands of years the aboriginal tribes had occupied the whole of the continent. The Portuguese were constantly sending out exploring parties to discover this unknown world, but the Spaniards especially from their settlements on the western coast of S. America sent out their expeditions too. Some of these explorers actually sailed within sight of the coasts of Australia, yet failed to recognise the existence of a new continent; but it was in the faith established by the explorers of this period that the continent of Australia existed in the theories of the geographers for the following two centuries. Following on the explorations by the Spaniards and Portuguese came the ...ration by the Dutch. Fr[illegible]

Islands the Dutch sent out many exploring expeditions which failed only because their commanders did not fully realise the significance of the discoveries which they had actually made. The journey from the Cape of Good Hope to their possessions often led them to the western coast of Australia, and gradually the existence of a New Holland sprang into being. Under the régime of the governor, Van Diemen, many discoveries were made and many expeditions were sent out. The chief of all these expeditions was that under the explorer Tasman, which led to the accurate charting of the northern and western coasts of Australia, and to the discovery of Van Diemen's Land (Tasmania) and New Zealand. Even now the full significance of the discoveries was not grasped, and with the death of Van Diemen and Tasman, exploration on a large scale died out for nearly a century. The part played by Englishmen in the exploration of the early days was small. Dampier was the only Englishman to bring back any report of Australia, and his report was so bad that no further attempt was made until Lieutenant James Cook discovered that part of Australia which is now known as New South Wales. Yet the importance of this discovery was not the report of Cook, but the report of Joseph Banks, the scientist, upon the fertility and succulence of the land in the immediate vicinity of Botany Bay. It was by means of his reports that Australia came into popular view as a possible settlement for English colonists. The early gov. of Australia, it is no exaggeration to say, s the gov. of Joseph Banks, and he lone stood between the gov. and ustralia when they decided to bandon it and persuaded them not . The first colonial project, as far New South Wales was concerned, s for the settlement there of a mber of the loyalists of America o had been turned out owing to success of the American colonists. ey finally settled elsewhere, but ing the negotiations for settlet in New South Wales it had been ded that, should they settle there, should be protected by the ish, and should also employ con- from Britain to supply their r. The first colonists were ly composed of convicts, and s with men such as these that in Arthur Philips, R.N., the British governor of New South had to develop the ter. re- by Banks as fertile and easily ped. This success, as may be ed, was not great; amongst the convicts there were none w pretensions to skill in agriculture, a above all, the land reported by Ban as so fertile turned out to be just th opposite. Still, in spite of difficultie some progress was made, some settle ments were founded, and the town o Sydney began to be built. The colony however, remained for some considerable time far from being self-supporting, and often the whole settlement was placed on short rations. The difficulty of maintaining discipline was also a great problem, but the greatest of all difficulties at the beginning proved itself in the convict guards. Enlisted from men who were more or less blackguards, officered by men who regarded Australia as a purely financial speculation, they speedily obtained overwhelming authority, exploited the colonists to the best of their ability, and mutinied when the offences of which they had been guilty brought down the censure of their superiors. During this period, however, the coasts of Australia and Tasmania were explored. The fallacy as to Tasmania being part of the mainland was exploded, and developments in the number of convict settlements resulted from the new discoveries. The names which are most famous as far as this work is concerned are those of Bass and Flinders. Many of the settlements made were, however, unsuitable, and the settlers soon left them in disgust. The founder of Australia's greatest industry was one John McArthur. He experimented with the Spanish merino sheep, found the country admirably suited for the rearing of such animals, and proceeded to make this sheep industry the essential industry of Australia. He took the part of the convict guards against the governor, Bligh, and had him imprisoned by the mutineers for two years, during which time the convict guards were the sole rulers of the colony. This mutiny brought matters to a head in Australia, the home gov. adopted a fresh policy, and the governors appointed in future were not sailors but soldiers. The new policy also was a more reasonable one. Australia was no longer to be regarded as a huge gaol. The convicts sent out there might speedily by good conduct earn their release and become property-owning citizens themselves. The emancipated convicts under the governorship of Macquarie began to build up a new society, but whereas many results were good, many of the attempts were failures. In the meantime the exploration of Australia went on apace, and especially under the

governorship of Brisbane was the colony developed. The next governor, Darling, was given great powers, and the colony was remodelled, being now made into a colony inhabited by freemen to whom the convicts were sent as servants. But Darling was opposed to the policy of emancipation, and the cry for real liberty in the colony was soon so great that Darling was recalled in 1831. The policy of emancipation was continued, the constant stream of immigrants from England helped on the policy, and the emancipated convicts were soon, by their good behaviour, able to wear down the stigma of their crimes. Tasmania was made into the real penal settlement, and this quietened down into an orderly and disciplined country. With the development of New South Wales went also the development of other parts of Australia. The Fr. had long desired to make settlements on the continent, and the British gov. had to hasten in order to prevent their doing so. The western parts of Australia were occupied between 1820–30, and the gov. adopted in part the ideas of James Peel. They advertised for settlers, and to each of these settlers was to be given forty acres of land for every £3 or £3 worth of goods that the settlers took out with them. But the policy of land giving was bad, for the smaller settlers quickly found themselves with property miles from any town and of bad quality, whilst the larger landowners, given the first chance, had appropriated the land in the vicinity of the towns and of the best quality. Another prob-em which began now to face the hite pop. of A. was the lack of ervants, whence the necessity for n increased immigration. The ex-eriments tried on this occasion were ot worthy of success, and, further, l not succeed. These experiments land and in the servant question l been carried out respectively in estern and Southern Australia. t now under the able governorship Bourke and Gipps in New South es that colony was beginning to and that it should be given self-, and that England should cease end convicts to it. The trans-ation of convicts to the main-of Australia ceased in 1840, the convicts were replaced by s of a system of assisted immi-ns. In the meantime, in spite considerable opposition, Port had been estab., and a year ame the establishment of the of Melbourne. By 1842 New Wales had developed to such ent that she was granted a tion and a council partly-

elected. A question which agitated New South Wales was attempt of the home gov. to c mence again sending convicts to colony. The convicts were not lowed to land, and the colon definitely decided that in future convicts would be allowed to transported to Australia, and follo ing on this came the freeing of T mania from the convicts who h previously been sent to it. In 18 the colonies which were in existen were: New South Wales, Tasmania S. Australia, and Victoria (the latte having then but recently objected t the union with New South Wales, and been successful in obtaining separation). The gold rushes which commenced in 1848 were not a source of undiluted benefit to the Australian gov. Frequent riots took place with which in many cases the gov. was not capable of dealing, the most famous of these being the Eureka stockade episode. The gold rushes were, however, on the whole, of considerable benefit to practically all the Australian colonies, which profited by the increased trade and wealth which these rushes brought about. In 1855 S. Australia received a constitution, and in 1859 we have the establishment of Queensland. Exploration had, in the meantime, continued to a great extent, and the hitherto unknown parts of Australia were opened up. Since the grant of self-government to the Australian colonies many grave problems have had to be faced and solved. The tendency set in rapidly towards the closer union of the colonies in a commonwealth, an object which was brought to a successful issue at the beginning of the present century. The colonies, however, had also the problems of the land question, education, railways and immigration to settle. The land question, which was to Australia the most important, seemed to have been settled when it was upset by the gold rushes, but the Torrens Act did much to settle disputed claims to land. The question of education provoked serious controversy, but was finally settled by means of a compulsory state education measure which is strictly undenominational. In the matter of railways it was only natural that in order that the country should be fully developed the railway system would have to be perfected. The various states began after 1870 to develop the railways, and since that date over 20,000 m. of railways have been constructed, the money borrowed for the purpose being a heavy burden to the population, but the benefits which accrued being enormous. Most of the railways converge towards

the capital. The question of immigration and a 'white Australia' is one of the most difficult problems which the Australians and the B. E. have to face. The Australians refuse to admit on equal terms Asiatics, especially Japanese and Chinese, who, as they point out, have a totally different system of civilisation.

History of Australia during and after the Great War.—The solidarity of the Australian people in the crisis of 1914 was an eloquent testimony to the strength of the bonds of Empire. The Commonwealth Government put a Division of troops at the disposal of the Imperial Government as soon as the War began, and a small highly efficient force was promptly sent to German New Guinea. At no time did A. adopt conscription, though attempts were made to introduce it. This refusal was probably due, says the late Sir Charles Wade, Agent-General for N.S. Wales, to an entire misconception of the issue involved. Yet the sympathy of the Australian people for the Allied cause was unmistakable, and, in its results, their voluntary effort was remarkable. Out of a population of less than 5,000,000, 400,000 enlisted, *i.e.*, 8 per cent. (the normal percentage in a conscript country is 10 per cent., but in the Great War this was exceeded). Their total casualties were approx. 214,000, of which the dead amounted to 55,585, and the prisoners of war to less than 200. Sixty-three Australians were awarded the V.C. and 16,814 were awarded other military honours. Australian forces took part n every theatre of war, but it was he Gallipoli Campaign that shed an nperishable lustre on their endur- nce and bravery (*see* ANZACS; ALLIPOLI CAMPAIGN). They fought so in defence of the Suez Canal and the Salonika front in the early ars of the war. In 1916 the Anzac rps went to Flanders, where in the mme battles of that year they re engaged in the heavy fighting Pozières, Fromelles, and Mouquet m. The following year they were aged in the Battle of Arras, Battle Messines, Ypres Battle 1917 rd Battle of Ypres), including the kless struggle of Passchendaele the battles for Polygon Wood. ne Somme battles of 1918 they red vital service in stemming remendous Ger. onslaught to- Amiens, joining in the historic er-attack of April 24, when the tant position of Villers Breton- vas retaken (Battle of the Lys). umont Hamel (July) they took an effective combined attack s and infantry. In the concluding battles of the Western F the Anzacs were conspicuous in second Battle of Bapaume, especia at the capture of Mont St. Quen (Aug. 31 to Sept. 3), a position whi General Rawlinson, commanding t Fourth British Army, to which t Australians, under General Monas were attached, considered so impre nable that he did not feel justified i attacking it. The initiative in thi attack came from the Australians they advanced day after day, undaunted by losses, but remorselessly breaking down the Ger. resistance. In the words of General (afterwards Lord) Rawlinson, 'In the last hundred days the Australians gained a reputation which will live throughout Europe.' Elsewhere, their infantry and mounted troops co-operated in the victories of General Allenby in Palestine, while yet other Australian forces took Ger. New Guinea, Nauru, and the Bismarck Archipelago, these former Ger. possessions now being mandated to the Australian Government under the League of Nations. The Australian Navy also took part in various operations, in the Pacific in 1914, in the West Indies and also in co-operation with the Grand Fleet in the North Sea. The Australian War Debt was estimated at £300,000,000, of which two-thirds was raised in A. two years after the War. The interest on the debt represented £14,000,000, and the annual charge for pensions was £5,000,000.

A Navy Department was created in 1915. Australian submarines rendered useful service in the War. Submarine *AE 2* was lost in the Dardanelles in 1915. The famous Ger. cruiser *Emden* was sunk off N. Cocos Island by H.M.A.S. *Sydney* (1914). Wing-Commander Goble and Lieut. McIntyre accomplished the first sea-plane flight round the Continent in 1924, the year which saw the unfortunate loss of the battleship *Australia*. An impetus to Australian naval ambition was given in the same year by the visit of the British cruiser squadron under Admiral Field.

Australian Alps, a mt. range in the E. highlands of Australia, extending for about 300 m. through Victoria and New South Wales in a N.E. direction, and forming a continuation of the Great Dividing Range. The chief peaks are Mt. Townsend (7350 ft.) in the Kosciusko knot, Mt. Bogong (6508 ft.), and Mts. Feathertop and Buller. The mts. are mostly well wooded and seldom attain the snow-line.

Australian Commonwealth, the federal union of New South Wales, Victoria, South Australia, Queens-

land, Tasmania, and Western Australia, constituted by proclamation on Sept. 17, 1900, under an act of parliament dated July 1900, which came into existence on Jan. 1, 1901. *See* AUSTRALIA.

Austrasia, the eastern portion of the Frankish kingdom, included Belgium, Lorraine, and the r. b. of the Rhine. The cap. was at Metz. Founded in 511, it was ruled until the eighth century by the Merovingian kings. After Charlemagne's death it was merged into Germany.

Austregisille, St. (551–624), popularly known as St. Austrille or St. Outrille, after serving at the court of Gontran, King of Burgundy, took holy orders and subsequently became archbishop of Bourges, his native place. His remains, exhumated in 1334, were burnt in the sixteenth century by the Protestants.

Austremoine, or Stremonius, St., apostle of Auvergne in third century. He [illegible] into Issoire, [illegible] Paul, there, is on the site of an older chapel built over his tomb. He was the first bishop of Clermont-Ferrand, and founded the abbey of St. Allyre.

Austria. German-speaking Austria is a Republic formed out of a portion of the former Empire of Austria-Hungary. When Hungary, in 1918, declared its independence and the [illegible] of Czecho- [illegible], Austria expressed a desire to attach itself to Germany, but this was prohibited by the victorious Allies. Under the Constitution of 1920, German-speaking Austria is declared to be a Federal republic of eight provs. and the City of Vienna. These provinces are Lower A., Upper A., Salzburg, Styria, Carinthia, Tyrol, Vorarlberg, and Burgenland. The combined area is 32,400 sq. m., and the pop. was estimated in 1924 to be approximately 6½ millions.

Most of the surface of A. is mountainous, being crossed by Alpine ranges. The highest points are in the Noric Alps, which, with the Rhætian Alps, extend from Switzerland to the Danube. In this system is Ortler Spitze, 12,814 ft. (*q.v.*). Some famous mountain passes are the Stelvio, 9240 ft., leading to the Swiss Engadine, the highest pass in Europe; the Brenner Pass, 4600 ft., in the Rhætian Alps from Innsbrück to Botzen; and the Semmering Pass, 3250 ft., in the Styrian Alps, between Neustadt and Graz. Of rivs. that have navigable tributaries all that is left to A. is a part of the Danube from near Passau through Linz to Vienna, with the tributary Inn; but the Rhine flows for about 25 m. of its course between A. and Switzerland.

In its pre-war amplitude A. was ill supplied with canals, but still retains the chief, the Vienna Neustadt Canal, which in Lower A. has a length of 40 m.

The climate of A. is favourable. Generally speaking, Vienna, with about the same average temperature as London, has a much warmer summer and a more severe winter than the latter city. The rainfall of the Alpine district is excessive, reaching 60 ins.

Regarding the mineral wealth, no European country could, before the Great War, boast more prolific resources than A., though Russia had gained the ascendancy over the output of gold and silver. But although dismembered, A. has a by no means unimportant output of minerals. Large quantities of lignite and anthracite are produced; and a million tons of iron ore are mined annually. Copper, zinc and lead are also produced. Mining has been developed for many centuries, and at all times has received the patronage and help of the Government. In rank of output of minerals, Styria, Carinthia, Salzburg, and the Tyrol are, in that order, the leading provs., but are inferior to Hungary and Bohemia in that respect. There are gold dists. in Salzburg and Tyrol, and silver is also mined there. Mercury is found in Styria and Carinthia; zinc and lead in Carinthia; iron in nearly every prov., though most of it is mined in Styria, Carinthia, and Carniola. Arsenic, cobalt, sulphur, and graphite are also worked. Building stone, gypsum, and marble are quarried in profuse quantity. A feature of the mineral production of old A. was the salt output, produced by the evaporation of salt spring-water. The chief works are at Ebensee, Aussee, Hallstadt, Ischl, Hallein, and Hall in Tyrol. Many mineral springs exist, and among the most famous are the sulphur baths of Baden, which has a European reputation.

Agriculture is still, however, the principal occupation of the people of A. Half the total acreage is in Upper and Lower A. The chief crops are wheat, rye, barley, oats, potatoes and turnips; but, although the country is predominantly agric., the foodstuffs produced are insufficient to meet the requirements of the pop. There is a fair output of raw sugar, and also of livestock. Tobacco and hops are also raised, and a profusion of fruit is found in the orchards of Upper and Lower A. and the Tyrol. Cider in large quantities is made in Upper A. and Carinthia. Wine production,

though small in comparison with that of Hungary, is cultivated in most of the prov., except Upper A. The forests offer many opportunities for the timber trade, among the chief secondary products being tar, potash, charcoal, bark and cork.

The animals found in A. include bears, chamois, and wild goats in the Alpine dists. There is an abundance of fish in the Danube.

Piano-making, the manufacture of automobiles, furniture, and textiles represent the only industries of importance. Tobacco, produced in nine factories, enjoys a monopoly and the annual output reaches 200 million cigars, 4¼ million cigarettes, and 50,000 metric quintals of smoking tobacco. The most important article of village industry is silk, Tyrol being the centre; but the rise of artificial silk has injured the trade. The annual value of A.'s exports is about £66,000,000, and of imports £100,000,000. A. is essentially a country which may normally be expected to show an adverse trade balance, and yet preserve its economic equilibrium by a revenue derived from sources outside the confines of the Republic. As a fact the high proportion of industries of the former Austro-Hungarian Empire are still owned in A. and pay dividends to Vienna; and the recovery of Vienna as a financial and commercial centre yields no insignificant revenue for services rendered, and besides this source, there is a good income from through traffic and the tourist trade.

The earliest known inhabitants of A. were a Celtic tribe called Taurisci, who were succeeded by the Norici. In 14 B.C. the Romans conquered the Norici, and the ter. N. of the Danube passed into the hands of the Mar-comanni, while to the S. were situated Noricum and Pannonia, two Rom. provs. in the latter of which lay Vindo-ona, now Vienna. At this time yrol formed part of Rhætia. An vasion of the Boii in the fifth cen-ry destroyed these boundaries, and period of constant warfare and con-ation saw the succeeding occupa-ns of the Vandals, Goths, Huns, mbards, and Avars. Subsequently Lombards settled in Italy, and R. Ens now formed a div. between Avars on the one side, with the arians on the other. In 796 lemagne conquered the Avars, in order securely to hold his ion there, estab. the E. Mark. It om this ter. that the Austrian e definitely traces its origin and opment. Shortly, however, it d almost complete obliteration hands of the Hungarians, who t long profit by their success, for in 955 Otto the Great defe them at the battle of Augsburg, restoring the E. Mark to the Germ Later, in 983, he invested Leopol Babenberg with the title of margr Under the Babenbergs the domin received considerable enlargement ter. and development of its intern strength. Indeed, the whole progr of the Austrian empire may be said be due to this great and powerf house, and to the succeeding dynast of the Hapsburgs. Between 1141 an 1177 two dists., the E. Mark and th Lower Mark, *i.e.* the ter. lying below the Ens, were united into a dukedom under Henry Jasomirgott, who became the duke of the newly formed duchy. To Jasomirgott Vienna owes to a certain degree its foundation. He also participated in the second crusade. The duchy became much extended as a result of the efforts of his successors, while the title of the greatest of their house can be assigned to Leopold VI., whose several and successful campaigns directed again the Hungarians and Mussulmans earned him considerable distinction. In 1246 his successor, Frederick, died in an engagement with the Magyars, at which event the famous house ceased to exist.

For a time the country was without a ruler, and in the confusion that followed, A., to which had been added Styria, supported their choice of Ottakar of Bohemia, but he opposed the imperial control of Rudolf of Hapsburg, and met his death during the battle of the Marchfield, 1278. The emperor passed the ter. to the hands of his two sons, Rudolf and Albert, but shortly afterwards it was left to the sole possession of Albert, who now held A., Styria, and Carinthia. The great administration of the Hapsburg line now began. In the midst of his vigorous restoration of order in a country chaotic in its condition, Albert was murdered by his own nephew. In 1322 Louis of Bavaria defeated Frederick, one of Albert's five sons, in his attempts to succeed to the dukedom. Meanwhile the Swiss, in 1315, had revolted against Leopold who suffered defeat. Albert II. in 1330 succeeded, and to a considerable extent expanded the duchy. He was succeeded by Rudolf and Albert II. respectively, and in the latter's reign Tyrol was added to the Austrian boundaries. Albert IV. assumed the reins of control, and his son, Albert V., by marrying the daughter of the Emperor Sigismund, succeeded to the ownership of Hungary and Bohemia. He now became Ger. Emperor as Albert II. The possession of these two additional countries did not last long, for shortly after

Moreover, it was during this reign that the old order of gov. with its conservatism and its lifeless monotony was changed for the beginnings of modern methods.

Immediately following the death of Charles VI. the European powers sought to take advantage of a female ruler. Under the Pragmatic Sanction they had promised Charles to support her rule, but the atmosphere of the age was not conducive to honourable observance of oaths, and Maria Theresa found herself facing Europe. England alone stood by her. During the war Frederick II. of Prussia conquered Silesia. The Elector of Bavaria was crowned King of Bohemia and elected emperor as Charles VII. in 1742. Supported still by the Hungarians, Maria Theresa, undaunted, managed against her numerous enemies practically to hold her own. At the peace of Aix-la-Chapelle, 1748, A. remained almost intact. Charles VII. *d.* in 1745, and Maria Theresa's husband, formerly the Duke of Lorraine, was elected Emperor of Germany as Francis I. Maria now saw that France was to be feared no longer as her most formidable enemy. In 1756 the Treaty of Versailles was concluded, in which the long rivalry between the Hapsburgs and the Bourbons came to an end. Chafing at the loss of Silesia, Maria, with the aid of France, Russia, Saxony, and Sweden, moved against Frederick of Prussia.

The Seven Years' War ensued, at the end of which the Prussians still held Silesia. Joseph II. became Ger. Emperor on the death of his father, Francis, holding with his mother the monarchical reins. In 1780 Maria Theresa died.

Relieved of the wise and restraining influence of his mother, Joseph's reign was characterised by a spirit of violent and ill-considered reform. Discontent, roused by the sweeping nature of his sudden changes, fermented in Hungary and the Netherlands, in the midst of which turmoil he died, 1790, after being forced to reverse his entire policy of reformaion. He was succeeded by his rother, Leopold II., who was sucessful in restoring peace with the etherlands and Hungary. The fate Marie Antoinette, his sister, and r husband, Louis XVI., led Leopold , to ally himself with Prussia ainst France, an alliance which was turbed by his death in 1792. No e was lost, however, for France nediately declared war on his son, ncis II.

uring this reign the foreign policy . owed most of its adoption and ution to Metternich. Francis II. possessed few qualities calculated sult the disturbing elements pre lent in A. when he succeeded to throne. A consuming love of det added to a zest for thoroughn exacting to a painful and stifli degree, led to a gradual decay of responsibility on the part of his min ters. Metternich, conscious of th disease, knew that its existence wa due only to listlessness in the mind of the nation.

In 1797 France secured Lombard and the Netherlands. Two year later Francis II. united forces with Russia, and the Austrian borders underwent many changes till 1804, when Francis, anxious to prevent an indignity to his country, in the event of Napoleon demanding its subordination, abandoned the title of Ger. Emperor, and adopted that of Hereditary Emperor of A. as Francis I. In 1809 the peace of Vienna seriously reduced the Austrian ter., after which event Napoleon's marriage with the Archduchess Maria Louisa was shortly announced. Hence, in 1812, A. became an ally of Napoleon, without, however, rendering him any practical assistance. At the battle of Leipzig, 1814, A., joining the Grand Alliance, assisted in the wrecking of Napoleon's power, and in the following year, at the treaty of Vienna, as a recognition of her struggles and vicissitudes, she received Venice and Dalmatia, important gains, on account of the opening thus afforded for her foreign trade. Till 1840 a long peace followed, during which A. became an important factor in determining European politics. She had also allied herself to Russia and Prussia.

Meanwhile, acute dissatisfaction felt and expressed against the rigorous character of the bureaucratic system of gov. came to a head. Metternich owed his position as a minister to a great extent to the royal favour, and he was unwilling to suggest a reform of which he himself saw the urgent need. In Italy, Hungary, and Bohemia the growing discontent reached a climax, and on the death of Louis Philippe, 1848, revolutionary elements broke out over all Europe. In the crisis Metternich fled to England, and, left in the hands of the populace, the whole system tottered and fell. Austrian power and its gov. lay among the ruins. Chaos followed, the centre of disorder being Vienna. Finally, a check was placed upon the confusion by Prince Windischgrätz, whose energies in the battlefield crushed an attempt at revolt on the part of the Slavs in Prague.

It was in Italy that A. began first to recover herself, for Lombardy was

delivered into her power, after a truce with the Sardinians. Affairs meanwhile were going from bad to worse. In Hungary the parliament was dissolved; but in the face of its dissolution it continued to hold meetings. The populace rose and, on the order of the 'dead' parliament to call out the militia, a fresh insurrection was complete. Windischgrätz, however, besieged the cap., which surrendered. A reaction followed, but Ferdinand, who had shown li'tle ability and less readiness during the crisis, was persuaded to abdicate in favour of the young Francis-Joseph. Under the direction of Radetzky the reclamation of N. Italy was speedily accomplished, its complete restoration culminating in the surrender of Venice, 1849. In Hungary, however, the Magyars, under Bem, met with more success, and Hungary was reproclaimed a separate state, free from the dominance of the Hapsburgs. Their freedom lasted for only a short time, for Francis-Joseph, aided by Russia, completely crushed the Hungarians. The subjugation of Hungary was accomplished. While these operations had been in course of execution, A., keenly alive as ever to its interests, strenuously opposed a projected confederation of states under Prussia, thereby defeating the Prussian king in his wish to become Emperor of Germany.

For the next ten years a policy of bureaucratic gov. was revived, the constitution which had been granted n 1849 being destroyed. In almost very dept. of the gov. a rigorous and merciless system of oppression was llowed. The Catholic Church lent s support to the bureaucracy, and, led by an ally of such power, the lot Hungary, Italy, and Bohemia beme constitutionally insupportable. ense irritation was felt by them at ruthlessness which marked the strian treatment of the national irations. Moreover, Prussia be formidably to contend with A. ascendancy in the German empire, the aggressive and determined ude maintained by A. won her oveted recognition. mplications now arose during the ean War. Much of A.'s strength its position with relation to the n Peninsula. This was now tened, and anxiety concerning reservation of her own standard ver struggled with feelings of ude towards Russia, to whom s so indebted. The time with certainties and its opportuniecame ripe for Italy to assume atening front. Austrian adation in Italy had given little tion to the Italians, and their national feeling centred in Sardi In 1859 Italy prepared for a det mined opposition to a rule th cramped their national freedo Napoleon added his services to t Sardinians with such success that t Austrian emperor was compelled offer terms of peace. When all wa concluded Venice was all that re mained of Italy to Austrian contro

Smarting under the humiliation sh had suffered, A. was yet again calle upon to enter the field. Prussia had not forgotten the arrangement by which A. had become the leading element of the German empire. The protracted rivalry was now brought to a head. During their alliance in expelling the Danes from Schleswig-Holstein, a quarrel arose between the co-operating victors. In 1866 war was declared, and A. suffered heavy defeat at the battle of Sadowa. Prussia now occupied the middle states of Germany which formerly had supported A. At the termination of the struggle A.'s supremacy over Germany was brought to an end, and Sardinia, who had taken the field against her, demanded and obtained the prov. of Venetia. Austrian influence to the W., so long successfully maintained, was now completely broken.

Hungary's claims to be recognised as a separate and distinct country were now, with great advantage, pressed forward. In 1867 its political rights were successful in being regarded as justified. This agreement was the famous Ausgleich, which has since been in force, and which has to a sufficient degree justified its adoption. By 1907, however, it became obvious that to exist separately was commercially prejudicial to both countries. Accordingly a 'customs and commercial treaty' was formed involving chiefly the following conditions: 1. Each country was to adopt a separate but identical tariff of customs 2. Hungary was to facilitate railway communication from Vienna to Dalmatia, while each country bore the responsibility of construction in its own area. 3. A. was to facilitate railway communication between Hungary and Prussia. 4. A court of arbitration was to be formed for the settlement of state differences. 5. Commercial treaties with foreign countries were to be undertaken by separate nominees. After 1867 it became patent that the old system of gov. by bureaucratic methods was an absolute failure, and measures towards a more constitutional freedom were passed. The presence, however, of the many nationalities within its borders rendered the task of settling all claims

difficult. From a different point of consideration, however, the existence of so many conflicting requirements and national tendencies helped valuably to increase the security of the dual monarchy. For without union no significant disturbance could be organised, and harmony of action, where the aims were so entirely opposed, it was impossible to establish.

The foreign policy of A. has been to create a tangible understanding with Germany and Russia. With Germany the difficulties were not so great, and from 1879 an informal agreement has existed. Bismarck visited Vienna and arranged a treaty by which Germany bound herself to support A. against Russia, while Austria-Hungary promised to assist Germany against a combined attack from France and Russia.

For a time Russia joined the Triple Alliance with A. and Germany, but the question of Russia's aims in the E. made a more definite attitude towards each other difficult of settlement. During the Russo-Turkish war of 1877–8 this feeling was irritated by a decided tendency on the part of the Magyars to sympathise with the Turks. Meanwhile the position [illegible] of B [illegible] these [illegible] cont[illegible] them [illegible] anxious one. (For the history of A. during the Great War *see* AUSTRIA-HUNGARY).

History of Austria from 1918.—The Republic of A. was declared on Nov. 12, 1918, and the government assumed by a National Assembly which appointed a provisional cabinet and proceeded to pass laws. Early in 1919, the National Constitutional Assembly, consisting of a single chamber, was elected on the basis of universal and proportional suffrage; all subjects, if 21 years of age, have the vote, and are eligible for election if 30 years of age. Under the Constitution which came into operation on Nov. 10, 1920, a President is chosen for four years by both Houses, but he may not be re-elected more than once. The Legislature comprises an Assembly, the *Nationalrat*, and a First Chamber, the *Bundesrat*, the one elected by popular vote, the other chosen by the provincial diets. The powers of the [illegible] All special p[illegible] and equal rig[illegible] citizens.

The political history of A. for the past ten years has been characterised by a struggle between the Socialists and the bourgeoisie. Socialism, as was to be expected, dominated the National Assembly after the overthrow of the Dual Monarchy and the setting u[illegible] The first Chancello[illegible] was the Socialist [illegible] whose domestic [illegible]ablish a working agreement between the Social Democrats and the Christian Socialists. In th[illegible] bly of 1919 the [illegible] numbered 70, the [illegible] 64 members, [illegible] Nationalists, the [illegible] others less than 30 between them. A [illegible] bourgeois parties only obtained 28 seats shared among ten political sections, as against 80 Socialist [illegible]cialists. [illegible] a Coalition Government, and this Coalition was preserved when the Government, which had resigned as a protest against the terms of the Peace Treaty presented by the Allies, was re-formed under the same Chancellor. While the Coalition lasted, with the Socialists as the dominant factor in the State, the aspirations of the middle classes, notably towards a *rapprochement* with Germany, were thwarted. In the next ensuing few years, the chief issues, apart from the ever-absorbing questions of rents and social legislation, which in themselves inflamed class feeling, were the Tyrol question and the [illegible] with Germany, [illegible]anner, allied, as [illegible] to pro-German [illegible] two issues overrode class prejudices, affecting as they did, and still do, the deep-seated instincts of the overwhelming majority of the Austrian people; but in the handling of them, the Clericals have shown more resolution than [illegible] question [illegible] the Ger[illegible] old Aust[illegible] Great War was divided between Austria and Italy, [illegible] to Austria [illegible]s of con[illegible] outside the [illegible] affected, because upon its solution depends the further [illegible]tain even so [illegible] was left to h[illegible] The urgency of the [illegible] gether with the [illegible] the bourgeoisie, [illegible] tion and ranged t[illegible] all practical purposes, might be regarded as representative of the middle classes, against the Socialists, whose powers now gradually declined.

In July 1927, serious rioting occurred between the Socialists and the bourgeoisie, and much damage was done to private property. In the early part of the year following, the Tyrol question again became acute; but though the palpable intention of Mussolini, the Italian Dictator, to omit no step that might Italianise the whole crown land, gave rise to strong and extensive comment in the press of both countries, no constructive measures were adopted to relieve the tension, despite the bitter complaints of the Tyrolese themselves. Towards this infiltration policy of the Italians, the Clericals, under Chancellor Seipel (Christian Socialist), could, in the nature of things, adopt only an attitude of passive resistance. Seipel argued that while sympathetic towards his fellow-countrymen in their oppression by Mussolini, he had no right or wish to interfere in the internal problems of a neighbouring State, but that, at the same time, he would not discourage the free and orderly discussion of those problems in a duly elected assembly. Mussolini denied the charges of oppression, described the benefits conferred by Fascism upon the Tyrolese, and expressed contempt for the suggestion that the matter should be referred to the League of Nations. The crucial point with Mussolini was, and is (1930), the safeguarding of the Brenner Pass, which, he said, he would defend at all costs. Dr. Seipel, in view of the disparity between the armed forces of the two nations, was helpless, but he was nevertheless bitterly assailed, both in Tyrol and in A. generally, for his surrender to Mussolini's threats; but at the present moment (1930) the problem remains unchanged, though still one for diplomatic discussion and likely to develop into one of the danger spots of Europe.

The bloody conflicts in A. in the summer of 1927 were an expression of revolt against the Seipel Government, and from that point the power of the Socialists generally began to wane; and in the years following there was a further diminution of their strength. A significant outcome of the riots of July 1927 was the formation of the *Heimwehr*, or bourgeois private army, which was designed as a challenge to the activities of the Socialists' armed forces, which, in times of stress, patrolled Vienna in the hope of overawing the middle classes. Far from achieving that result, a repetition of the July riots was only narrowly averted in the following October, when the Socialists and the *Heimwehr* came into collision at Wiener Neustadt, the recognised headquarters of the former force. The Federal Government, however, despatched a sufficiently formidable force to prevent a conflict, and though parades of the other two formations took place, no casualties occurred, and the sole concrete result was that the political leaders met to discuss the possibility of disarming illegal political formations. The Socialists, as might be expected, accused the bourgeoisie of using the *Heimwehr* as a means of coercing them to the will of the middle classes, and more might have come of this feeling but for the fact that in 1928 all shades of political opinion in A. were united or not unfavourable towards the policy of 'Anschluss' or the movement for a union between A. and Germany. Dr. Seipel, with true statesmanship, opposed such a union in his public utterances; but from the fact that he abstained from entering into any economic agreement with any of the succession states which did not include Germany, afforded evidence of his real sympathies. At the moment, the question remains in the balance, the political aspect tending perhaps to become merged in the cultural.

Religion.—Religious liberty is a fundamental law of the Republic, and the principle is embodied in the Treaty of St. Germain 1919. There are approximately 6,000,000 Catholics, 200,000 Protestants, and nearly 200,000 Jews. The Catholic Church has two Archbishops and 4 Bishoprics.

Defence.—By the Treaty of St. Germain, universal compulsory military service is abolished in A., and the total number of military forces in the Austrian Army is limited to 30,000 men, including officers and depot troops. These forces are organised into mixed brigades. As A. now has no sea-coast, the former Austro-Hungarian fleet has ceased to exist, and the only vessels of war left to A. are four patrol boats on the Danube.

Internal Communications.—There are 4000 m. of railway lines, of which 3600 are operated by the State. An Austrian aviation company, subsidised by the Government, operates a regular service between Vienna, Salzburg, and Innsbruck, and between Innsbruck and Constance.

Austria, Don Juan d', the name of two battleships: 1. A Spanish cruiser launched 1887, and captured by Admiral Dewey at Manila. 2. An out-of-date Austrian vessel, named after a natural son of Emperor Charles V.

Austria, Lower, a province of A., which, before the Great War, was a crown land, forming the E. half of the archduchy of A. Area 7,452 sq. m. Pop. 1,480,449 (1923). It is

traversed by the Danube, to the N. of which lies a tableland, while to the S. of the riv. is a mountainous region occupied by off-shoots of the E. Alps. A good deal of the land is under forest, but agriculture, vine-growing, and cattle-rearing are extensively carried on, and there are large manufs. of tobacco, glass, cottons, haberdashery, wine, chemicals, sugar, leather, etc. Sawmilling and weaving are important industries. The former cap., Vienna, is now a separate province.

Austria, Upper, a province of and formerly a crown land of A., forming the W. half of the archduchy of A. Area 4631 sq. m. Pop. 876,074 (1923). It is traversed from N.W. to S.E. by the Danube, to the N. of which lie the tablelands of the Böhmerwald, while to the S. is a mountainous region of the N. Alps. There is a large portion of forest land. The chief industry is agriculture, all the cereals except maize, hay, fruit, etc., being largely produced. The climate is too cold to be altogether favourable for vine-growing. The mineral wealth includes salt, lignite, gypsum, whetstones, and granite. Cattle are reared in large quantities. The chief manufs. are steel ware, textiles, rubber, leather, paper, and glass; and brewing and distilling form important industries. Cap., Linz; other towns, Steyr, Wels, and Gmunden.

Austria-Hungary. The old Austro-Hungarian monarchy, or Dual monarchy, as it existed prior to the autumn of 1918, comprised a total area of 40,456 sq. m. and, with the exception of Russia, was the largest separate state in Europe. It possessed, however, only 300 m. of coast line, all on the Adriatic Sea. The bordering countries were Italy, Switzerland, Bavaria, xony, Prussia, Rumania, Serbia, ontenegro; and the aggregate pop. fore the Great War was estimated 51,250,000, made up of 12,000,000 rmans, 10,000,000 Magyars, 00,000 Czechs, 5,000,000 Poles, 0,000 Ruthenians, 3,700,000 Serbs, 0,000 Rumanians, 2,240,000 Jews, 0,000 Slovenes, and 770,000 ans. This pop. was unevenly ered. The districts to the S.E. hose of the N.W. were, and are, ost thickly populated, while the e regions and those of the Carans were, and are, the most ly inhabited. It was essentially eat diversity of races in A.-H., lly in Austria, that led to the disruption of the monarchy e collapse of the Austrian and ian armies. The most numer- of the races embodied in the peoples before 1918 were the who formed most of the inhabitants of Bohemia, Morav Carniola, Dalmatia, Croatia, Slavon the Woiwodina, and Galicia. Th were divided into the Czechs Bohemians, the Ruthenians and th Poles. The Germans formed about quarter of the whole population, an inhabited chiefly Austria, Salzburg Tyrol, Styria, Carinthia, and the W of Hungary. Other inhabitants were the Romance peoples (those speaking Roman languages), of whom there are W. and E. classes. The W. are Italians, Latins, and Friulians, the E. are Rumanians. The Magyars are located chiefly in Hungary and Transylvania. Apart from some migrations of Czechs, there is no great change in this distribution.

The name 'Austria' is derived from Oesterreich, and means 'Eastern Kingdom.' Though the old empire was formed by the union of the two countries under one crown, the administration of the two countries was separately recognised and, as will be seen by reference to the history of Austria (*see* AUSTRIA), Hungary agitated for a separate political existence over sixty years ago, the 'Ausgleich' of 1867 being no more than a compromise based chiefly on commercial considerations. At the close of hostilities in the Great War, both Austria and Hungary became separate independent republics and, on the principle of 'self-determination,' a number of the constituent races, either singly or in combination, grouped themselves into independent sovereign States or were voluntarily incorporated in existing states. Thus, the Serbs, Croats and Slovenes (Bosnia, Herzegovina, Montenegro, and Serbia) combined to form the Kingdom of Yugo-Slavia; the Czechs and Bohemians proclaimed Bohemia, Moravia, Silesia, and Slovakia to be a new Republic—Czecho-Slovakia; the Galician Poles became incorporated in the restored Polish State; while Transylvania was ceded to Rumania and the Ukrainians became one of the constituent states of the Union of Socialist Soviet Republics. (*See also* CZECHO-SLOVAKIA; POLAND; RUMANIA; RUSSIA; YUGO-SLAVIA.)

The international solidarity of the Dual Monarchy before the Great War was founded largely on the maintenance of the alliance with Germany. The loyalty of the Archduke Francis Ferdinand, nephew of the Emperor Francis Joseph, to this alliance, coupled with his patriotism and administrative ability, rendered the future career of this prince one of peculiar importance to A.-H., more especially as he was credited with being chief protagonist of the policy of incorporating the Bosnian Serbs and the

Serbo-Croats into a triple kingdom with A.-H. The Archduke was, therefore, anathema to all patriotic Serbs and an obstacle to those dreams of territorial expansion which they had long entertained. Here, then, were the seeds of the gravest of European conflicts; for the Austro-Hungarian Government had frankly declared that the existence of the Dual Monarchy was really in jeopardy through the intrigues of the Serbs, while at the same time Russia as openly espoused the cause of the Serbs. When, therefore, the Archduke and his wife were murdered in the streets of Serajevo, in June 1914, it became clear that A.-H. would receive the full support of Germany in crushing Serbia, particularly as the Austro-Hungarian Government had, a year previously, invited the co-operation of Italy to the same end, at a time when the situation was by no means ripe for drastic action. The occasion now, however, being opportune, matters moved precipitately towards a general European conflagration; for Germany at once recognised in it a favourable combination of circumstances for breaking through the 'iron ring,' which her diplomats imagined, on good or bad grounds, her neighbours were forging round her. There seems to be no doubt, in the light of the memorandum indiscreetly published in 1916 by Prince Lichnowsky, Ger. ambassador to London, in which that diplomatist deplored the mistaken policy of his own Government, that this was the general position in 1914, and that the Ger. Government was only too eager to hasten the conflict against Russia and her ally France. Lichnowsky, n fact, saw in A.-H. a nation urged on o its doom by the machinations of its ar more redoubtable neighbour. A.-H ent an ultimatum to Serbia on July 3, and thereafter events moved apidly. For though the Serbian overnment undertook to comply ith the demands of A.-H., and fered to refer all disputed points The Hague or to a Conference Powers, the Austro-Hungarian vernment disregarded the reply l mobilised its army. Germany, by isting that the dispute wholly conned A.-H. and Serbia, and by osing the efforts of the future Allied vers to get it referred to The Hague, ctly promoted not only the Austrio-ngarian plan of destroying Serbia n independent nation, but ind the design of wiping out Russian ence in S.E. Europe; and thus n a week of Austria's formal ration of War against Serbia 28) Germany, A.-H., Russia, France were in a state of war; his soon involved, through the violation of Belgian neutrality, intervention of Great Britain. the end of the first week of Augu A.-H. had formally declared w against Russia. There being no in cation whatever that either of the Ce tral Powers would make peace sep ately, the alignment of opposed n tions was complete for a general ou break.

At the very outset, A.-H. had to bea the brunt of the conflict agains Russia. This entailed a weakening o her campaign against Serbia on the Bosnian front, besides necessitating the defence of Galicia, which by its natural position, was really Russian territory, and also the maintenance of sufficient forces at home against the possibility of the intervention of Italy. Two Austro-Hungarian armies, to the number of 600,000 men, were concentrated in Galicia, based on Przemysl and Jaroslav and on Lemberg. Some initial successes were gained, largely because the Russian plans envisaged an attack on Galicia from the E. The Russian army then retired before the pressure of General Dankl from Russian Poland, but, returning to the offensive, attacked the other Austrian army under Auffenburg, while another Russian army, under General Brussilov, advancing from Kiev, assailed Auffenburg's flank in the Tarnopol quarter. Ruzsky leading the first Russian army, took Sokal, and Brussilov captured the strong positions of Halicz and Tarnopol, and then turned against Lemberg, while Ruzsky, advancing N. of this city, pierced the Austrian left and threatened Auffenburg's communications. The Battle of Lemberg was fought on Sept. 1–2, and resulted in the capture of the city and of 100,000 prisoners. The advance into Galicia continued, and soon another battle was being fought on a front extending from the Vistula to the Dniester (Sept. 6–10). In this battle the Archduke Joseph was decisively defeated, and the whole Austrian front was routed. This occurred just when the First Battle of the Marne was won on the Western Front, but the sanguine hopes of the Allies were doomed to frustration, and the 'brilliant second,' supported by her far more powerful ally, was by no means annihilated. The Austro-Hungarian army in the vicinity of Cracow was reorganised by the Germans and preparations were made for a counter-offensive, which was ultimately launched in January 1915. This counter move failed, and the great fortress of Przemysl, which had been besieged for three weeks, surrendered. The Russians then resumed the offensive previously begun

by Brussilov in the Carpathians. Galicia had thus fallen to Russia, and the fate of A.-H. might well have been sealed early in the War, but for the transfer by the Ger. High Command of large forces from the Western to the Eastern Front.

With these distractions in Galician Poland—which, as usual, was the cockpit of the nations—the Austrian army, invading Serbia in August 1914, across the Drina, had made but little progress and in a short time were hurled back into their own country. The struggle between the Austrians and the Serbs was never decisive, but Belgrade surrendered in December 1914, after the second advance of the Austrians on Valjevo. Shortly afterwards the Serbians replied by decisively defeating two Austrian army corps at Valjevo, driving the Austrians across the Drina and recapturing their capital, which King Peter entered in triumph at the head of his army on Dec. 15. A period of comparative quiet now followed, owing largely to the attitude of Italy, who was making it clear to A.-H. that the 'punishment' of Serbia must not involve damage to Italian interests in the Balkans without compensation; and before long Italy was demanding important concessions from A.-H. as the price of her continued neutrality (*see* ITALY). In April 1915 the Italian Government demanded of the Austro-Hungarian Government the surrender of Trentino, together with the towns of Bozen, Trent, and Rover- [illegible] the old boundary of 1811; the extension of her frontier along the Isonzo Riv. so as to embrace Gorizia, Monfalcone, and other strong positions; the autonomy of Trieste; the cession of certain Dalmatian Is.; and the recognition of Italian sovereignty over Avlona (*q.v.*) The rejection of most of these demands followed as a matter of course, and this, added to the Italian Government's mistrust of the German Government's guarantee of such concessions as A.-H. was willing to make, led to Italy's denunciation on May 4 of her treaty of alliance with A.-H. and, though A.-H. made a last desperate attempt to buy off Italy with an abject compliance, at all events on paper, with virtually all the abovementioned demands, Signor Salandra, the Italian premier, broke off further negotiations and gave free rein to Italian enthusiasm for the dream of the Italian hegemony of the Adriatic to be fulfilled by force of arms. From this point, however, the Austro-Hungarian armies on the Eastern Front, reorganised with amazing skill by the Ger. military authorities, met with better fortune, though it is to be borne in mind that they were threaded through and through with Ger. soldiers. Huge armies of massed [illegible] Germans were [illegible] tremendous [illegible], while in Hungary two German armies, under General Boehm Ermolli and General [illegible] Mackensen, [illegible] success. Th[illegible] 'steam-rolle[illegible] kensen, by despatching von Linsingen to threaten Stryj and Lemberg, kept the Russian command in a state of great uncertainty as to where the blow would fall. From being invaders, the Russians had fallen back [illegible] Soon after the Ger. and Austro-Hungarain forces had entered Lemberg, the Russians were in precipitate retreat through the Carpathian passes and all the big fortresses of Galicia had been recovered by Mackensen.

At the beginning of 1916 there was general optimism in Germany. Russia had retreated and the Ger. forces were masters in the Near East. Both Germany and the Allies now tried to obtain a decision, and both failed. But there was this difference—that the failure of the Allies was but transient, whereas that of Germany was really the beginning of a two years' process of the gradual decline of the dream of *Mittel-Europa*. Towards the end of 1916, the Central Powers individually and [illegible] mitted proposals [illegible] representatives o[illegible] and Switzerland [illegible] 'to enter into pe[illegible] is probable that [illegible] she had reached t[illegible] conquests, and that the time was ripe for the consolidation of those gains. The Allies rejected the offer on the ground of defect of reparations and guarantees, and, moreover, they had reached the point that their peoples were in a mood only to dictate, not to receive peace terms, nor were they dismayed by the military successes of the Central Powers, whose territory was free of invaders and their solidarity intact. This solidarity remained unimpaired throughout 1917, in spite of the intervention of the U.S.A., the effect largely of the defection of Russia. Had the Russian armies been able to continue their pressure against the strung-out lines of the Austro-Hungarian armies from the Sereth to the Baltic Sea, while the Allies on the Western front, the Italian armies on the Carso, and the

Army of the Orient in Macedonia took the offensive the artificial conception of *Mittel-Europa* must have dissolved sooner than it did. But though the Russian Revolution, in its earlier stages, seemed to promise some hope to the Allies, it soon became evident that the expectation that it would react on the Central Empires so as to encourage a continuance of internal disorders, especially in A.-H., to the ultimate disruption of the Germano-Austro-Hungarian Alliance, was ill-founded. In the first six months of 1917 there was certainly grave turmoil in A.-H. The social upheaval in Russia was not without its effect in betraying, by analogy, the political inequalities of the heterogeneous peoples comprised in the Dual Monarchy; for in Austria alone 10,000,000 to 12,000,000 Gers. overrode twice that number of Slavs, and in Hungary 10,000,000 Magyars dominated an equal number of Slovaks and Southern Slavs. Necessarily only the Ger. elements of Austria and the Magyars of Hungary acquiesced in the Prussian hegemony in *Mittel-Europa*. Plots and executions of civilians and mutinies occurred. The Czechs and Slovaks were on the point of open rebellion. The seeds of what was destined to be the governing principle of the Treaty of Versailles, the principle of self-determination, were being sown among the Serbs and Montenegrins, the Roumans and Ruthenians and other races. The artificial entity of the Dual Monarchy was thenceforth doomed, though the early hopes of the Allies in that connexion were for the time being sorely belied. The Emperor Karl, who succeeded the aged Franz Joseph in 1916, had been advised, as the best means of holding the Dual Monarchy together, to attempt the conversion of A.-H. into a four-fold kingdom, consisting of A.-H., Yugo-Slavia, Poland, and Czecho-Slovakia; and with ostensible liberality of mind he appointed two Czechs, Count Czernin and Count Clam-Martinitz, to the posts of Foreign and Prime Minister respectively in Austria. But the task of compromise as between the Pan-Germanists and the Czechs was too great for either minister. Count Clam-Martinitz, with a show of democratic principle, convened the Reichsrat, which had not met since the war began; but far from pacifying the discordant babel of conflicting nationalities, the assembly of deputies merely provided a convenient platform for still more vehement denunciation of the existing regime. Czech and Yugo-Slav members alike demanded comp[illegible] and the premier [illegible] cure the support [illegible] outvote the rest. The ruse was in vain, for the Poles were as insistent on their own unity and independence as the other two races. This political situation was aggravated by the formal indictment of the Hapsburg Monarchy by the National Council of Czechs, for 'bringing on the war without the consent of the Czech members of Parliament' and for various crimes against the Czech soldiers and civilian pop. In July 1917 Dr. Trumbitch, the leader of the Yugo-Slavs, signed with M. Pashitch, the veteran premier of Serbia, the celebrated Declaration of Corfu, under which the signatories agreed to constitute an independent State comprising Serbia, Montenegro, and the S. Slavs of A.-H. The immediate effect of these events was that Clam-Martinitz gave way to a case-hardened bureaucrat, von Seidler; while in Hungary, Count Tisza, the distinguished Hungarian premier, who had been in office since 1913, was manœuvred out of his post by a rival group of Magyars under Count Julian Andrassy. These changes, of necessity, were intended to harden resistance to democratic reform and demands for independence, but it was clearly realised by the Emperor Karl that the sole chance of saving the Dual Monarchy, if any, and of solving the intricate racial problems which now agitated his kingdom, lay in concluding immediate peace with the Allies. Hence, all through these earlier months of 1917, he and Count Czernin were secretly corresponding with the Allies for the conclusion of a separate peace; and [illegible] with the Fren[illegible] his relative [illegible] Karl even w[illegible] support to French claims in Alsace-Lorraine. The morale of A.-H. was clearly weakening. The Allies, never ill-disposed towards A.-H. endeavoured by every means to wean A.-H. from the Ger. alliance, and the U.S.A., though in a state of war with Germany, refrained from declaring war against A.-H. till the end of the year. Thenceforth only Germany continued to cherish any illusions anent the permanence of *Mittel-Europa*; for already Bulgaria was tired of the War, and Turkey had become disintegrated in its Asiatic territories.

The strange vicissitudes of war, however, kept alive, even in A.-H., the external appearance of a favourable military and political situation. The soil of A.-H. was still free of invaders, the Treaty of Brest-Litovsk (*q.v.*) and the Treaty of Bucharest (*q.v.*) had released her arms from the Russian and Rumanian fronts respectively, and her forces held Montenegro, most of Serbia and Albania, to say nothing of

by Brussilov in the Carpathians. Galicia had thus fallen to Russia, and the fate of A.-H. might well have been sealed early in the War, but for the transfer by the Ger. High Command of large forces from the Western to the Eastern Front.

With these distractions in Galician Poland—which, as usual, was the cockpit of the nations—the Austrian army, invading Serbia in August 1914, across the Drina, had made but little progress and in a short time were hurled back into their own country. The struggle between the Austrians and the Serbs was never decisive, but Belgrade surrendered in December 1914, after the second advance of the Austrians on Valjevo. Shortly afterwards the Serbians replied by decisively defeating two Austrian army corps at Valjevo, driving the Austrians across the Drina and recapturing their capital, which King Peter entered in triumph at the head of his army on Dec. 15. A period of comparative quiet now followed, owing largely to the attitude of Italy, who was making it clear to A.-H. that the 'punishment' of Serbia must not involve damage to Italian interests in the Balkans without compensation; and before long Italy was demanding inportant concessions from A.-H. as the price of her continued neutrality (*see* ITALY). In April 1915 the Italian Government demanded of the Austro-Hungarian Government the surrender of Trentino, together with the towns of Bozen, Trent, and Rovereto, so as to restore the old boundary of 1811; the extension of her frontier along the Isonzo Riv. so as to embrace Gorizia, Monfalcone, and other strong positions; the autonomy of Trieste; the cession of certain Dalmatian Is.; and the recognition of Italian sovereignty over Avlona (*q.v.*) The rejection of most of these demands followed as a matter of course, and this, added to the Italian Government's mistrust of the German Government's guarantee of such concessions as A.-H. was willing to make, led to taly's denunciation on May 4 of her reaty of alliance with A.-H. and, hough A.-H. made a last desperate ttempt to buy off Italy with an oject compliance, at all events on aper, with virtually all the above-entioned demands, Signor Salandra, e Italian premier, broke off further gotiations and gave free rein to lian enthusiasm for the dream of Italian hegemony of the Adriatic e fulfilled by force of arms. From point, however, the Austro-ngarian armies on the Eastern nt, reorganised with amazing by the Ger. military authorities, with better fortune, though it is to be borne in mind that they w threaded through and through w Ger. soldiers. Huge armies of mas Austro-Hungarians and Germans w now gathered for a tremendo counter-blow in Galicia, while in Hungary two German armies, und General Boehm Ermolli and Gener von Linsingen, were preparing for drive against the Carpathian positions. Under the able Ger. general, vo Mackensen, their arms met with entire success. The days of the Russian 'steam-roller' were over. Von Mackensen, by despatching von Linsingen to threaten Stryj and Lemberg, kept the Russian command in a state of great uncertainty as to where the blow would fall. From being invaders, the Russians had fallen back on the defensive; Lemberg was soon untenable, and fell on June 22, or only three weeks after the fall of Przemysl. Soon after the Ger. and Austro-Hungarain forces had entered Lemberg, the Russians were in precipitate retreat through the Carpathian passes and all the big fortresses of Galicia had been recovered by Mackensen.

At the beginning of 1916 there was general optimism in Germany. Russia had retreated and the Ger. forces were masters in the Near East. Both Germany and the Allies now tried to obtain a decision, and both failed. But there was this difference—that the failure of the Allies was but transient, whereas that of Germany was really the beginning of a two years' process of the gradual decline of the dream of *Mittel-Europa*. Towards the end of 1916, the Central Powers individually and simultaneously submitted proposals to the diplomatic representatives of the U.S.A., Spain, and Switzerland and other neutrals, 'to enter into peace negotiations.' It is probable that Germany knew that she had reached the zenith of her war conquests, and that the time was ripe for the consolidation of those gains. The Allies rejected the offer on the ground of defect of reparations and guarantees, and, moreover, they had reached the point that their peoples were in a mood only to dictate, not to receive peace terms, nor were they dismayed by the military successes of the Central Powers, whose territory was free of invaders and their solidarity intact. This solidarity remained unimpaired throughout 1917, in spite of the intervention of the U.S.A., the effect largely of the defection of Russia. Had the Russian armies been able to continue their pressure against the strung-out lines of the Austro-Hungarian armies from the Sereth to the Baltic Sea, while the Allies on the Western front, the Italian armies on the Carso, and the

a large part of N.E. Italy. But within the kingdom the disruptive tendencies noticed above were increasing, and, aggravated by the stringent economic situation, the victories or stories of victories availed nothing against starvation and political disillusionment. Marshal Ludendorff, the Chief of Staff of the German Army Headquarters, was baffled; he intimated unreservedly to the Austro-Hungarian Government that he would undertake to try to force an issue on the Western Front, but that the effort must be conditional on A.-H. overwhelming Italy. Thus A.-H. was induced to make her supreme and disastrous onslaught against Italy, in the hope of getting that Power out of the War by force of arms. A combined strategic plan for breaking through on the Asiago plateau from the Tyrol, in conjenction with a grandiose flanking movement on the Piave, so as to come right down to the very gates of Venice, was launched. The offensive began in mid-June 1918, but at the end of a few days the Italian and British (under the command of General Cavan) forces, commanded by General Diaz, who was fully cognisant of the Austro-Hungarian plan, had assumed the counter-offensive and begun the final blow against the armies of A.-H.

Owing to these internal dissensions, the Dual Monarchy began to show unmistakable signs of collapse long before the defeat of Bulgaria and Turkey and long before the final Allied victory on the Western Front. The position *vis-à-vis* the various constituent nationalities of A.-H. and the monarchy was like that of a couple of aged parents dominated by a numerous and determined progeny. From covert intrigues the innumerable associations of professional men and peasants and mercantile communities soon proceeded o open propaganda; mutinies in the ustro-Hungarian armies and wholeale desertions from the Czecholovakian, Yugo-Slavian, and Polish nits to the ranks of the Allies were creasing day by day; loyalty to the apsburgs had disappeared; National ouncils of the various subject nationties were formed in the great Allied pitals and in America. In the early t of 1918, the Poles at length threw their lot with the other nationali-. Hitherto their sympathies had n undecided, owing to the grant to n by von Seidler in 1916 of the us of a separate kingdom; but n, through Germany's insistence, Polish territory of Cholm was led over to the new Ukraine blic, the incensed Poles joined with the other separatists,

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Slavia. The other nationalities, Transylvania and Bukowina, then in their turn seceded from Austria and Hungary respectively, and negotiated for union with Rumania. It was now the turn of Hungary herself to repudiate any continuance of union with the Teutons, and at the end of Oct. a revolution in Budapest resulted in Count Karoly's announcing that the Magyars were freed from further allegiance to Emperor Karl, and would be constituted an independent Republic. The Dual Monarchy was thus, at long last, at an end. The culminating blow to the 'ramshackle empire' was delivered in Vienna, when a mass demonstration of students and artisans called for a democratic administration. Karl relinquished his crown with dignity and bowed to the inevitable; and on Nov. 13, the National Assembly in Vienna formally declared Ger. Austria a republic. (Consult von Glaise-Horstenau, *The Collapse of the Austro-Hungarian Empire*, transl. by Ian F. D. Morrow (1930) (Dent); Karl Nowak, *The Collapse of Europe* (1924).)

[For the history of Austria and of Hungary since 1918 *see under* AUSTRIA; HUNGARY; and HUNGARIAN REVOLUTION. For the military operations on the Italian front *see* ITALIAN FRONT, GREAT WAR CAMPAIGN ON.]

Austrian Lloyd Steam Navigation, *see* LLOYD TRIESTINO.

Auteuil, dist. of Paris, on the r. b. of the Seine, close to the Bois de Boulogne. It was formerly a vil. in the dept. of Seine. Molière lived ...ere, and the place has numerous ...terary associations.

Authon, Jehan d' (1466–1527), Fr. ...oet and historian, was a native of ...eaurepaire, and a Benedictine monk. ...o was historiographer to Louis XII., ...o subject of his chief work, *Chron...e du roi Louis XII.* Amongst ... poetical works is a translation of ...d's *Metamorphoses.*

...uthors, The Incorporated Society ...was founded by Sir Walter Besant ... other literary men in 1883 for the ...ection of writers in the fields of ...ral literature, drama, and music. ...vises members with regard to the ...cation of their works, and in the ...ests of its subscribers keeps a ...nt outlook on publishers in re... to matters affecting payment, ...rawing up of agreements, etc. ...ent years the inventions of the ...phone, the cinema, and broad... have enormously extended ...ork of the society. There is ...eement between the Society ... B.B.C. as to the fees payable ...dcasting its members' work. ...ciety has now about 4,000 members, and it publishes a qua... journal called *The Author.* The ... dent is Sir James Barrie, who ... ceeded Mr. Thomas Hardy on ... latter's death in 1928. The add... of the secretary is 11, Gower St... London, W.C.1. In the U.S.A. ... Authors' League of America, ... corporated, founded in 1912, ren... its members similar services.

Authors' League of America, found... in 1912, opens its membership ... authors, artists, playwrights, a... writers of scenarios for the film... provided that they make a regul... profession of their work and are no... merely unpaid amateurs. The Leagu... gives helpful advice to its member... on the placing of their works, advise... them as to the proper rates of re... muneration, and assists them in legal... difficulties, especially in the intricat... matters of copyright.

Auto, the name of various types of religious and morality plays popular in Spain and Portugal from the twelfth century onwards, and still performed in the latter country. They reached their highest perfection in the As. *sacramentales* of Lope de Vega (1562-1635) and Calderon (1600-81). The former was the author of 400 As. These plays were generally represented on days of religious festivals, the feast of Corpus Christi being especially chosen for such performances. They were mostly of an allegorical nature, the leading characters being personifications of vices, virtues, etc. They were frequently produced with great elaboration.

Autobiography, *see* BIOGRAPHY.

Autocars, *see* MOTOR-CARS.

Autochthones, the Gk. equivalent of the Lat. term aborigines, was applied to the first inhab. of a dist. as distinct from later comers. In the Gk. mythology various dists. had their own As., or first parents, who were supposed to have sprung from the rocks and trees.

Autoclave, an air-tight heating vessel, on the principle of Papin's digester, made of iron or steel, usually supplied with a safety-valve, in which substances can be heated above their boiling-points under pressure. Various types of A. are used respectively for sterilisation and chemical and cooking purposes. In chemistry As. are used to produce reactions under great pressure.

Autocracy, *see* GOVERNMENT.

Auto-da-Fé (Act of Faith), the ceremony of the Inquisition in Spain and Portugal at which heretics were burnt after a public procession and service in the church. All Saints' Day was a favourite day for the *auto-da-fé.* An *auto-da-fé* was celebrated in Mexico as late as 1815.

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Autodidactus (the self-taught man), a psychological romance by the Arabian philosopher Abu-Bekr-ibn-Tofail (twelfth century), in which he relates the growth in knowledge of nature and God of a child growing up, from birth on a desert is. See Lat. translation, *Philosophus Autodidactus*, by Edward Pococke, 1671; and Eng. version, *The Improvement of Human Reason*, by S. Ockley, 1711.

Autograph, something written in a person's own hand. The term is applied both to mere signatures and to documents of any description. A. hunters have become one of the accepted nuisances of modern civilisation, but they may claim to be carrying on a custom which seems to have its origin as early as the fourteenth century, in the *Liber Amicorum*, a kind of visitors' book. In the sixteenth century were formed such famous collections of As. as those of Loménie de Brienne and Lacroix du Maine. Evidence of a craze for the signatures of celebrities is afforded by a number of albums of the time of Elizabeth and James I. now in the British Museum. Amongst high prices paid in recent years for As. of famous people are the 300 guineas paid by the British Museum in 1858 for a Shakespeare signature, and the £65 for a letter of Defoe, 1887. Many collections of A. reproductions have been pub., notably Nichols' *Autographs of Royal, Noble, Learned, and Remarkable Personages*, 1829; Delpech's *French Autographs*, 1832; *Isographie les Hommes Célèbres*, Paris, 1843; nd *Facsimiles of Royal, Historical, iterary, and other Autographs in the ritish Museum*, 1895-9. See also ünther and Schulz's *Handbuch für utographensammler*, 1856; Scott d Davey's *Guide to the Collector of storical Documents, etc.*, 1891; and oadley's *Autographs*, 1910. The ation between As. and character been ingeniously treated in Poe's *pter on Autography*.

uto-intoxication, the condition equent upon the production within he body of poisons due to pered functions of organs or tissues. ll the tissues of the body are ally interdependent, defect in part is followed by widespread s, and the symptoms of A.-I. are ingly very varied. Among the common types are uræmia, or adache and drowsiness consequent upon excess of urea in the Graves's disease, said to be due ss of thyroid secretion; the and coma of diabetes, caused aturation of the sodium salts lood by acetoacetic and oxyacids, the products of impereid metabolism; the degenerative changes in the spinal cord pernicious anæmia, due to absorpt of poisons from the alimentary can some forms of acute insanity, caus by defective metabolism or physi logical instability, or both; an general symptoms produced by th products of fatigue or indigestion.

Autolycus: 1. The son of Hermes and grandfather of Ulysses, wa notorious for the cunning with which he stole his neighbours' flocks. He was at last detected by Sisyphus, who marked his sheep under the feet. Shakespeare's A., in the *Winter's Tale*, possesses similar characteristics. 2. A. of Pitane, an early Greek writer on mathematics and astronomy (*fl.* fourth century B.C.), who is reputed to have taught Arcesilaus. He wrote two treatises of little value on the motion of the sphere and on the rising and setting of the fixed stars.

Automatic Action, a physiological and psychological term used to denote all non-reflex actions which are not the result of conscious endeavour. Actions may be purely A. when they are performed while the attention is fixed altogether upon another object, or relative, when the details of an action are performed unconsciously while the attention is fixed upon the end or some other part of that action. Sleep-walking is one of the most common forms of A. A., and many of the phenomena of divination, spiritualism, etc., may be explained on this basis. A. acts are distinguished from reflex actions by being produced by an internal instead of an external impulse, but in practice the two are frequently indistinguishable.

Automatic Machines, a term generally applied to machines which, when once set in action and provided with necessary motive power, continue to work without further human intervention. Many types of wood-working and metal-shaping machines, conveyors, weighing appliances, etc., are constructed on this principle, and penny-in-the-slot machines, A. voting machines, A. change machines, etc., carry out the same idea on a smaller scale.

Automatism, the power of self-movement without external stimulus as exhibited in life of the cell or organism, and in the will of man. The term is also applied to the philosophical doctrine that all the actions of living beings, including man, are physiological in their origin, and are not the effect of volition, which is merely an accompaniment of the action.

Automaton, a machine that imitates the actions of men and animals. The term is derived from the Gk., and

signifies something which moves of its own accord. The first recorded A. seems to have been the wooden pigeon made by Archytas of Tarentum, 400 B.C. It is probable that many of the apparent miracles which from the earliest times have imposed upon the credulous are to be attributed to this agency. Among the reputed *automata* of the middle ages mention must be made of the fly made by Regiomontanus, which came back to his hand after a flight round the room, and his eagle, which flew round the Emperor Maximilian during his entry into Nuremberg; also the speaking brass head of Roger Bacon and the figure which acted as doorkeeper to Albertus Magnus. In the first half of the eighteenth century three remarkably ingenious *automata* were constructed by the French mechanician Vaucanson. His flute-player, exhibited in Paris in 1738, was a remarkable imitation, the player placing his lips to the instrument and its fingers on the stops. The second was a tambourine player, and the third a duck that digested its food, in addition to eating, swimming, and drinking. Later came the writing A. of Knauss, exhibited at Vienna, and the trumpeters of Kaufmann and Maelzel. In 1851 a piping bullfinch attracted considerable attention at the London Exhibition. Amongst modern contrivances the place of honour must be given to Mr. Maskelyne's two figures, 'Psycho' and 'Zoe.' The former, first exhibited in 1875, played whist and worked out arithmetical problems, while 'Zoe' could draw the portrait of any one selected from a list of 200 persons of note. Kempelen's chess-player, introduced to London in 1783 as an A., was in reality worked by a human being skilfully concealed inside.

Automobile, *see* MOTOR-CARS.

Autonomea, the name of a genus of long-tailed decapodous Crustacea, which is founded on A. Olivii, which is about an inch long, and has a great likeness to Trika and Alpheus A. in habits. A. live in sea-weed, and are found in the Adriatic Sea.

Autonomous States are those in which the citizens enjoy a certain degree of self-gov. The term was first used of the communities of anct. Greece. The modern usage varies considerably; thus municipal corporations are locally A., and many religious bodies have a certain degree of autonomy, while A. S., such as British colonies or Bulgaria, which are self-governing under the suzerainty of another power, have practically complete independence. Autonomy, in its political sense implies the polity of self-gov. or a self-governing community. Various degrees of A. are exhibited by British colonies and dependencies, while a more perfect instance, perhaps, is afforded by the powers of independent action possessed by the ancient Gk. city communities. In Kant's philosophical use of the term it expresses the principle that no law without a moral foundation can be held as binding on the conscience.

Autoplasty (Gk. αὐτός, self, πλαστός, formed) is the repair of wounds or diseased parts of the flesh by means of tissues taken from other parts of the same body.

Autopsy, *see* POST-MORTEM EXAMINATION.

Autotype, *see* PHOTOGRAPHY.

Autran, Joseph (1813-77), Fr. poet and dramatist, gained the Montyon prize of the French Academy with his tragedy *La Fille d'Eschyle*, and was elected to the Academy in 1868. Amongst his vols. of verse are *La Mer*, 1835; *Milianah*, 1842; *Epitres rustiques*, 1862; and *Sonnets capricieux*, 1873, all of which are distinguished by purity of form and beauty of rhythm.

Autreau, Jacques (1657-1745), Fr. dramatist and painter, did not begin writing for the theatre until past the age of sixty. He wrote, amongst other plays, *Le Port à l'Anglais*, *Panurge à Marier*, and *La Magie de l'Amour*.

Autrefois Acquit and Autrefois Convict, pleas by an accused person that he had been previously acquitted or convicted of the same crime of which he is now accused. The plea only holds good in cases of acquittal or conviction by a court of competent jurisdiction.

Autumn, in a popular sense, comprises the months of August, September, and October. In the northern hemisphere autumn is astronomically the period between the autumnal equinox, when the sun enters the zodiacal sign of Libra (Sept. 22), and the winter solstice (Dec. 21). It corresponds to the spring-time of the southern hemisphere.

Autun, a tn. and episcopal see in dist. of same name, dept. of Saône-et-Loire, France, on the Arroux, 31 m. N.W. of Châlon by rail and 55 m. N.N.W. of Mâcon. It has important paper-making, textile, and tanning industries. A. has been thought by some to occupy the site of Bibracte, at the time of Cæsar's invasion of Gaul, the most important city of the Ædui. Under the Romans the name was changed to Augustodunum, and the city became famous for its school of rhetoric. After being destroyed in A.D. 270 by Tetricus and rebuilt by Constantine the Great, it became a

flourishing city, only to be sacked and burned in turn by the Vandals (406), the Burgundians (414), the Huns (451), and the Franks (534). It suffered a similar fate from the Arabs in 739, and from the Normans in 895. It was burned by the English in 1379. A. possesses many Rom. remains, including a theatre and a pyramid. The cathedral, dating from the eleventh and twelfth centuries, has a fine fifteenth century spire. Pop. 13,856

Auvergne, a dist. of Central France, formerly a separate prov., now forms the depts. of Cantal and Puy-de-Dôme, with the north-western portion of Haute-Loire. Upper A. is rugged and mountainous, with a climate subject to great extremes, while Lower A. is more level and contains some remarkably fertile districts. There are rich mineral deposits in the mountainous region, which also contains many mineral springs. The prov. was united to France in 1531, after passing through the hands of many families. The name is derived from the early inhab., the Arverni, who offered stern opposition to Cæsar.

Auvigny, Jean du Castre d' (1712-1743), Fr. writer and soldier, killed at the battle of Dettingen. He was the author of *Mémoires de Madame de Barnevelt* (in collaboration), 1732; *Histoire de la Ville de Paris*, 1735; and the first eight vols. of *Vies des hommes illustres de la France*, 1739-57.

Auvray, Jean (1590-1633), Fr. poet, and author of both licentious and devotional pieces. His chief works are *Poésies diverses*, 1608; *Le Trésor sacré de la muse sainte*, 1613; *Le Triomphe de la Croix*, 1622; and *Le Banquet des Muses*.

Auwers, G. F. J. Arthur (1838-1910), German astronomer, born at Göttingen; in 1859 became assistant at the Astronomical Observatory at Königsberg; studied at the observatory of Gotha, 1862-66; in 1866 became astronomer to the Berlin academy of Sciences. In 1878 he was appointed secretary of the physical and mathematical sections of the academy, and in 1881 director of the new observatory at Potsdam. He conducted expeditions to view the transits of Venus in 1874 and 1882. Author of *Untersuchungen über veränderliche Eigenbewegungen der Fixsterne*, 1862; *Catalog von 9789 Sternen*, 1896; and with Sir D. Gill, *Determinations of the Solar Parallax*, 1896.

Aux Cayes, tn. on S. coast of Haiti, W. Indies, 92 m. S.W. of Port au Prince. Pop. about 15,000. It is an episcopal see, and has exports of coffee and logwood.

Auxerre, cap. tn. of dept. of Yonne, France, 110 m. S.E. of Paris, on the R. Yonne. It has manufact cloth and chemicals, and pr wine. The fine Gothic cathedra partly from the thirteenth ce Other notable buildings are th fecture, formerly the bishop's p and the abbey St. Germain, now as a school. Pop. 21,200.

Auxetophone, an appliance inve in 1905 by the Hon. C. A. Parson Mr. Horace Short to increase volume and improve the tone of sound produced by talking mach by means of a valve which admit the trumpet of the machine bla of air setting up atmospheric vib tions in the same way as, but in greater degree than, is done by t diaphragm of the ordinary type machine.

Auxiliary Verbs are verbs which a used with other verbs to help to for the voices, moods, or tenses, of th latter. When so used they los practically all their original significa tion. Such verbs are 'have,' 'may, 'must,' etc. in Eng.; 'haben,' 'werden, in Ger.; and 'être,' 'avoir,' in French.

Auxonne, fortified tn. dept. of Côte d'Or, France, on the Saône, 20 m. S.E. of Dijon. Has cloth and other manufs. Noteworthy buildings are the Renaissance château and the church of Notre Dame (fourteenth century). Pop. 6500.

Auzout, Adrien (1630-91), French astronomer, and inventor of the micrometer, for measuring the apparent diameters of the heavenly bodies. He was the author of *Traité du grandes lunettes*, 1667; *Lettres sur les memoirs*, and various scientific

Ava, a ruined city, Burma, on the l. b. of the Irawadi, 6 m. S.W. of Amarapura. From 1364 to 1740 it was the cap. of Burma, and again from 1822 to 1838. It was destroyed by an earthquake in 1839.

Ava, *see* DUFFERIN AND AVA.

Avalanche (F. *avaler*, to descend), a mass of ice or snow, mixed sometimes with earth, which becomes loosened from a mountain slope and dashes into the valleys, sometimes causing great destruction. There are various kinds—drift or powder As., composed of dry powdering snow, and blown into the valley like a cloud; As. caused by the melting of the snow in spring, in which case the ground itself becomes loose, and is swept down with trees and rocks; and ice As., consisting of frozen snow and ice, sweeping down from the glaciers, most frequently during the summer months. In 1827 no less than eighty-eight people perished in an which swept away half the Alpine v of Biel.

Avalite, a silicate found in g

...ties at the Mt. Avala mines in Belgrade, where mercury is found.

Avallon (anct. Aballo), tn., dept. of Yonne, France, 30 m. S.E. of Auxerre, on the R. Cousin. The tn. has a church dating from the twelfth century. Pop. 6000.

Avalon (Apple-green Island), the paradise of Celtic mythology, Tennyson's 'island valley of Avilion.' Some have thought to identify the A. of Arthurian legend with Glastonbury. A. contained a mystic fountain and the magic apples, and was the Valhalla of the Celtic heroes.

Avalon, peninsula, Newfoundland, forming south-eastern portion of the island. In it stands the capital, St. John's.

Avalos, Ferdinand François d' (1489-1525), Marquis of Pescara, a distinguished soldier, wounded and taken prisoner at the Battle of Ravenna. He subsequently performed brilliant services in the wars of Charles V., and the honours of the battles of Bicocca and Pavia are largely due to him.

Avanturine, a glass-like variety of quartz, containing numerous spangles of brown mica. It is most common in the Ural Mts., but is also found in France, Spain, Austria, and India. There is also artificial A., consisting of glass into which red spangles of copper are introduced. A. is much used for the handles of umbrellas, brooches, etc.

Avanzi, Jacopo di Paolo d', a celebrated Italian painter of the fourteenth century. He is supposed to have been a pupil of both Franco Bolognese and of Vitale dalle Madonne. Only a few of his works remain. He painted the frescoes of the chapel of San Felice, in the church of Sant' Antonio at Padua, 1376; frescoes in the old church of the Madonna di Mezzaratta, with Simone da Bologna; two triumphs in a public hall in Verona; and some work in the chapel of San Giorgio in the church of Sant' Antonio at Padua, with Aldighieri da ...evio. Two pictures in the gallery of Bologna are also attributed to him.

Avaris, a city of anct. Egypt, on ...e isthmus of Suez, for long the ...ntre of operations of the shepherd-...ngs. It has been identified with the ...ropolis of the Greeks.

Avars, a warlike people of Tartar ...gin who settled on the steppes of ... Don and in the neighbourhood ...he Caucasus. They penetrated as ...ns Dacia and served in the army ...he Emperor Justinian, A.D. 558. ...r they took possession of Pan...n, and in 566 joined the Longo...s against the Goths. From this ... until the close of the first half of ...eventh century they greatly ex...d their dominion over the Bul...ns and the Slav peoples of the Danube, until, in A.D. 640, the... driven out of Dalmatia. Their... was finally destroyed by Charle... in 796, and as a separate race... seem to have disappeared ... afterwards.

Avasaksa, a mt. of Finland, ... Tornea, forming an excellent va... ground for witnessing the p... menon of the midnight sun.

Avatar (Sans. *avatâra*, desc...) signifies in Hindu mythology ... descent of a deity to earth in a vis... form. The ten incarnations of Vis... are notable avatars.

Avatcha, a bay on the E. coast ... Kamchatka. It is the best harbo... in the whole of the peninsula. Wi... in it is a smaller bay, on which ... situated Petropavlovsk, the cap. T... bay enjoys quite a world-wide fame o... account of its fine position and adva... tages, and for its beautiful scenery.

Avebury, a vil. and par. in Wil...shire which is remarkable as the sit... of what appears to have been on... of the largest Celtic or Druidica... temples in Europe. About 650 blocks of stone seem to have been placed in circles and rows. These stones, of which few remain, are of various sizes, from 5-20 ft. high and 3-12 ft. thick. There is a great variance of opinion as to the time when and the purpose for which this singular work was constructed, but it is most commonly thought that it was raised by the Druids before the Christian era, and was a national temple where they performed their sacred rites.

Avebury, first Baron (1834-1913), created 1900. One of the nation's greatest scholars, and the tremendous erudition amassed by him was upon a large number of subjects. He was educated at Eton, finishing his education at home. His many titles and distinctions could be numbered in hundreds. As a politician he represented Maidstone in parliament from 1870-80. The different presidential chairs held by him at various times embrace those of Entomological, Ethnological, Linnean, Anthropological, Ray, Statistical, African, Antiquary, Royal Microscopic, Sociological, Prehistoric Archæology, International Library, Societies and Institutions. His democratic tendencies were shown by his positions as principal of the London Working Men's College, and president of the London University Extension Society. Among his voluminous works are: *Use of Life*, *Pleasures of Life*, *The Origin and Metamorphoses of Insects*, *On the Senses and Instincts of Animals*, *Prehistoric Times*, *Coins and Currency*, *The Scenery of Switzerland*, *Free Trade*, and *Notes on British Flowering Plants*, *Ants, Bees, and Wasps*. Better known

as Sir John Lubbock, and, popularly, as the founder of August Bank holiday.

Aveiro, a tn. in the prov. of Douro in Portugal on the banks of the R. Vouga. It has earthenware factories, and salt is obtained from the lagoons about the tn.; besides this a trade in oil, wine, and oranges and a large fishing industry are carried on. It contains a cathedral, and is the see of a bishop. Pop. 10,357.

Avella, the Rom. Abella, is an It. tn. in the prov. of Campania, situated 15 miles from Naples; pop. 4000.

Avellaneda, Alonso Fernandez de, was the pseudonym employed by a Spanish writer who pub. a grotesque sequel to the first part of *Don Quixote*, before Cervantes pub. his own second vol. It has never been discovered whose identity was concealed by this *nom de guerre*.

Avellaneda, Garcia d', Count of Castrillo, a Spanish statesman, was viceroy at Naples from 1653-59. The Neapolitans rebelled against him, but he put down the outbreak, and also repulsed an attack on Naples by the Duc de Guise in 1654. During his tenure of power Naples was devastated by a plague, which killed 2000 of the people. A. helped to stay its ravages by transporting the cemeteries outside the town.

Avellaneda, Gertrudis Gomez de (1816-73), a Spanish poetess, *b.* in Cuba. She lived at Madrid from 1840 to the time of her marriage, in 1846, to a Spanish deputy, from whom she soon separated. She retired to a convent, from which, however, she came out in order to take up the career of dramatic author. In addition to many plays, both tragedies and comedies, she wrote some poetry and novels. She died at Seville.

Avellaneda, Nicolas (1830-85), an Argentine statesman, *b.* at Tucuman. His family were exiled from the country, but after the fall of Rosas in 1852 . returned. He became a member f congress in 1860, professor of olitical economy in 1861, and was inister of public instruction in 1868. uring his tenure of office the country ade remarkable progress, and in 74 he was elected president of the ublic. He put down the insurtion of Mibie in 1875, and in the ne year sent an expedition against Indians. He was superseded in yer by General Roca on Oct. 12, 0.

vellino, the cap. of the It. prov. of same name, 30 m. from Naples. built in a valley by the R. Sabato. e miles to the N. is the sanctuary onte Vergine, built in the eleventh ry, and once a rich Benedictine y. The prov. of A. abounds with nut-trees, which were much esteen by the Romans under the name *Nux Avellana*. Pop. 25,694.

Ave Maria, the first two words o Lat. prayer to the Virgin Mary us by Roman Catholics. The first pa is the salutation of the angel to Ma on her conception (Luke i. 28). T second part is an entreaty to th Virgin to pray for the salvation o sinners now and after death. Th prayer usually follows the *Pate Noster* or Lord's Prayer.

Avempace, or Aven Pace, an Arabian philosopher and poet, of whose life we know little save that he was *b.* at Saragossa. He was some time a physician at Seville; *d.* in 1138. Among his works are treatises on the soul, on solitary life, on logic, and on natural science. Many of these are unfinished.

Avena, the name of a genus of grasses which has deeply furrowed grains enclosed in glumes adherent to them. The genus contains fifty widely-distributed species, of which the most important is the *A. satira*, or oat.

Avenarius, Ferdinand (1856-1923), Ger. poet and writer, *b.* in Berlin; lived in Dresden from 1871. Author of *Wandern und Werdern*, 1881; *Lyrik der Gegenwart seit 1850* (an anthology), 1882; *Die Kinder von Wohldorf*, 1886; *Lebe!* 1893; *Max Klingers Griffelkunst*, 1894; *Stimmen und Bilder*, 1897; *Baal* (play), 1920; and founded *Der Kunstwart*, 1887.

Avenches, a vil. of Switzerland situated in a detached part of the Vaud. Formerly it was on the Lake of Morat, but now it is 1½ m. from the present shore. Its pop. exceeds 1724.

Avens are plants of the order Rosaceæ, related to the potentilla, strawberry, blackberry, and raspberry. The species *Geum rivale*, water A., and *G. urbanum*, wood A., grow in woods and damp fields of Britain. The mt. A., or *Dryas octopetala*, is an Alpine shrub.

Aventaile, the flap or movable front of the helmet in old armour.

Aventine Hill, one of the seven hills of Rome, lying to the E. of the Tiber. It was included in the city by Servius Tullius, and a settlement of the plebs was made upon it in 455 B.C. The anct. buildings formerly upon it have completely vanished.

Aventinus (1477-1534), a name used by Johann Turmair, the author of the *Annales Boiorum*. He was a native of Abensberg, whose Latin name he adopted. He has been called the Bavarian Herodotus, and his work, *Annales Boiorum*, is a history of Bavaria of much fame. Part of this work was suppressed on account of its reflections upon the

entrance to the infernal regions. The lake, which is 213 ft. deep and 3½ ft. above sea-level, figured as the scene of many other legends centuries ago. It was supposed to be connected with the lower world, hence Virgil's *Facilis decensus Averni*. In 214 B.C. Hannibal made a pilgrimage to it. Remains of baths are on the E. of the lake, including a lofty octagonal hall called the Temple of Apollo.

Averrhoa, a kind of sheep-sorrel, or sour-grass, allied to the oxalis, native to India. The leaves are alternating and have no stipulæ, while the flowers are arranged in clusters forming a panicle. Several varieties, such as the bilimbi tree or carambola, have an acid and refreshing fruit, used in the preparation of lemonades.

Averrhoes (1149-98), an Arabian philosopher and physician, was *b.* at Cordova, where his father was chief judge and priest. He studied theology and philosophy under Avempace and Tofail, and medicine under Avenzohar. He adopted the creed of the Ashari sect, and succeeded his father as chief judge. He was afterwards appointed chief judge at Mauretania, deposed for his heretical doctrines but afterwards reinstated. The writings of A. were numerous. An ed. in Lat. was pub. at Venice in 1562. His commentaries on Aristotle and Plato's *Republic* are perhaps the best known. The *Kullyat* was his chief medical work, and is usually known as *Colliget Avenois*.

Avers, a valley in Grisons canton, Switzerland, adjoining the Hinter-Rhein Valley. The lower portion, known as the Ferrera Glen, lying between Canicül and Cresta, is said to be the highest inhabited place in Europe (6394 ft.).

Aversa, a tn. and episcopal see of ampania, Italy. It was the first lace in which the Normans settled. n 1027 it was given to them by Duke ergius of Naples as a reward for help ainst Pandulf IV. of Capua. It is nnected by rail with Naples and serta, and it has a large lunatic ylum founded by Joachim Murat in 13. Pop. 23,587.

Avesnes, a tn. in N. France. It ns the cap. of an arron. in the t. of Nord. Its chief industry is l spinning. It possesses a sixth-century church famous for its peal of bells. Pop. 4937.

esta is the name under which the ean texts are grouped. These are cred books of the anct. Persians, re attributed to Zoroaster. For nation as to their purport, *see* STER.

yron, a dept. of S. France. Its 3386 sq. m. The first inhab. of ion were the Celtic Rutheni. It lies on the S. border of the cen plateau of France, and has for chief rivers the Lot, Aveyron, a the Tarn. All these are tribs. of t Garonne. The dept. has many teresting tns., the chief being Rode The climate is somewhat changeab owing to the varying elevations. the mountains it is severe, while i the valleys it is mild. The chief crop are wheat, rye, and oats. The inhab live by rearing live stock. Roquefor cheeses, Entraygues, St. Georges, Bouillac, and Najar wines have some reputation. The chief tns. are Rodez, Espalion, Millau, St. Affrique, and Villefranche. The Orleans and Southern Railways cross the district. Pop. 388,117.

Avezzano, a tn. of the Abruzzi, Italy. It is in the prov. of Aquila, on the main line of the railway from Rome to Castellammare Adriatico. Pop. 9315.

Aviano, tn. of Italy, near Monte Cavallo, 30 m. W. of Udine. Pop. 3136 (commune 8164).

Avianus, Flavius, a Lat. writer of fables. His age is unknown. He seems to have lived at Rome. His fables are forty-two in number, and resemble those of Babrius. They were dedicated to one Macrobius Theodosius. *See* the Prolegomena to the ed. of R. Ellis (Oxford, 1887).

Aviary (Lat. *avis*, a bird), a structure erected for the purpose of keeping birds in captivity. It is stated that they were erected first by the Romans.

Aviation, *see* AEROPLANE; AERODYNAMICS; AERONAUTICS; ENGINES; ATLANTIC FLIGHTS; AERO AVIATION, CIVIL OR COMMERCIAL.

Aviation, Civil or Commercial. Civil aviation received a great impetus from the Great War through the accelerated development of aeroplanes and the ever-increasing number of aviators. During the actual period of the War, civil aviation was of course restricted, but when in 1919 it was possible to remove the restrictions, commercial services and experimentation again went ahead. During the War the Air Council were invited by the Government to consider the development and regulation of civil aerial transport from the international standpoint. The Council through special Committees investigated questions of law and policy; technical and practical questions as to the powers of aircraft and the requirements of aerial service; commercial outlook of the aircraft manufacturing industry; labour questions; and scientific research. (*See Reports of The Civil Aerial Transport Committee* 1918. Cd. 9218). An International Air Convention soon

followed. This was signed in 1919 by all Allied and Associated Powers, and a protocol was drawn up to give States an opportunity of subscribing to the Air Convention while being at the same time free from the provisions forbidding the passage of aircraft belonging to non-contracting States over the territory of Contracting States. This veto was obviously ill-conceived, for it naturally made neutral States chary of joining a Convention which would effectually cut them off from Germany and other late enemy States, with which through the War they enjoyed freedom of communication. In the result the Protocol was signed by the U.S.A., Belgium, Great Britain, all the Dominions except S. Africa, S. America, Bolivia, Ecuador, France, Poland, Portugal, Rumania, Jugo-Slavia, Czecho-Slovakia, Italy, Siam. Apart from political considerations, the value of this International Convention is in co-ordinating the regulations for air traffic. It appears from the Civil Aviation Report that Great Britain in 1920 was the only country comprising both service and civil departments of aviation. Subsidies, long-distance demonstration flights and foreign India, South Africa, Australia, ranging from 10,000 to 30,000 m., have been undertaken with a view to gaining experience for the further development of civil aviation.

Civil aviation has undergone remarkable development in the U.S.A., and exhibits the greatest system in the world, with the possible exception of Germany. This development was due to the vast service of air mail which covers the U.S.A. like a network, and directly contributed to the growth of the nation's enormous commercial plane industry. There are now about 10,000 m. of airways either completely equipped or under construction for night-flying. There are also some thirty radio weather-reporting and communication stations on the trans-Continental mail and chief air-routes, and a telephone service on all the remaining air-mail routes.

Returns voluntarily supplied by Civil Air transport companies in the United Kingdom indicate that aerial transport is attended by no greater danger than land or sea. Flying, however, over regular routes is restricted chiefly to summer time. Over Continential routes in 1925 some 80,000 passengers were carried and

and influenced Erigena, Amaury de Bène, David de Dinan, Roger Bacon, and Giordano Bruno, and was fiercely opposed by Thos. Aquinas. Some of his short poems are preserved in the Jewish liturgy. See Kaufmann's *Studien über S. ibn Gabirol,* 1899.

Avicenna, an Arabian philosopher (980-1037). He was *b.* at Afshena in Bokhara. During his youth the family migrated to Bokhara, then famous for its culture among Moslem cities. Under a tutor his marvellous progress excited universal wonder and envy. Before he was sixteen he had mastered the Koran, much Arabic poetry, the *Isagoge* of Porphyry and the first propositions of Euclid, besides a thorough knowledge of medical theory and the discovery of certain new cures. He encountered much difficulty in the study of more recondite philosophy, but invariably had recourse to prayer, with what success is not known. Varying fortunes followed till he reached the office of Vizier. Insurrections, however, made the office insecure. A love of enjoyment proved so harmful to his constitution that he died. From the twelfth till the seventeenth century he was the guide of medical study in European universities. He owed his reputation to a treatise, *Canon of Medicine*. About 100 treatises are attributed to him.

Avicennia, a genus of tropical plants of the order Verbenaceæ. *A. tomentosa* is the white mangrove, used in Rio de Janeiro for tanning; *A. resinifera* is a native of New Zealand; *A. nitida* grows in Martinique.

Avicula is the name given to a genus of marine bivalves of the order Pseudolamellibranchea, with pearly shells. It derives its name from the wing-like expansions of the hinge which occur in typical species. It is allied to the pearl oysters, and in some classifications includes them.

Avienus, Rufus Festus, a Latin poet, who probably flourished in the fourth century A.D. The only knowledge of his life that we have is derived from an inscription, printed in Meyer's *Anthologia Latina*, which is supposed to refer to him. He wrote on geographical and astronomical subjects, chiefly in hexameters. He is supposed to be the Festus who was proconsul in Africa in 366, and in Achaia in 372.

Avi-fauna, a collective term applied to the various kinds of birds found in any country or dist.; the 'fauna' as regards the birds of that region.



AVIGNON FROM THE ISLE DE LA BARTHELASSE.
Showing the Pont St. Bénézet,—'Le Pont d'Avignon'

Avigliano is the name of a tn. in the It. prov. of Potenza, 8 m. N.W. of the tn. of that name. It manufactures explosives, and cattle-breeding flourishes. Pop. 17,440.

Avignon is a city of Provence, cap. of the Fr. dept. of Vaucluse, situated on the l. b. of the Rhone, 75 m. N.W. of Marseilles. It was anciently the cap. of Caodres, and there are numerous relics of Rom. times. The tn. and dist. afterwards belonged to the popes and were governed by a papal legate from 1348 to 1797, when France regained possession. It was also from 1309 to 1377 the residence of the popes, and from 1378 to 1418 the Fr. anti-popes dwelt there. Two eccles. councils were held there, in 1326 and 1337. The tn. is still surrounded by high *crenellated walls* dating from the fourteenth century, save on the N. side, where the Rocher des Doms, 200 ft. high, rises from the

Rhone. There is the eleventh-century cathedral of Nôtre Dame, with its papal throne, and near by a papal palace, built in 1339. There are a multitude of churches in the tn.; Rabelais called it 'la ville sonnante.' A university was founded in 1303, but abolished in 1794. The tn. is the seat of an archbishop, and contains a museum, picture gallery, and statues to Crillon, Petrarch, and De Girard. It manufs. paper, silk, leather, iron, etc., and is famous for its garden produce, and also produces fruit, wine, honey, etc. Pop. 48,172.

Avila, a tn. of Spain, cap. of the prov. of the same name, 70 m. N.W. of Madrid. It is an anct. place, and its Moorish walls and towers are in a state of very good preservation. It possesses also a fine Gothic cathedral and a Moorish castle, and is the bp. of Santa Teresa (*q.v.*). Pop. 13,704. The prov., which is part of Old Castile, is mountainous, having fertile valleys. Its mineral wealth is untouched, but it produces timber, chestnuts, and olives. The area is 2981 sq. m., and pop. 209,360.

Avila, Fernando, was a Spanish painter and sculptor of the sixteenth century, a pupil of François de Comontes, and a protégé of Philip II. His speciality was the painting and sculpture of altars.

Avila, Gil Gonzalez d' (1577–1658), a Spanish historian, was *b.* at Avila. He wrote histories of many of the kings of Castile.

Avila, Juan de, a Spanish mystic writer, was *b.* in La Mancha in the year 1500. He passed twenty years as a priest, and left sev. works which were pub. by Ruiz de Mesa in 1618. He has been called 'the apostle of Andalusia.' *See* Rousselot's *Les Mystiques Espagnols*, 1867.

Avila, Sancho de, was a Spanish general who served under the Duke of Alva. He defeated Louis of Nassau, and captured and sacked Antwerp in 1576. He was killed in 1579 at the siege of Maestricht.

Avila y Zuniga, Luiz de (*c.* 1490–1560), was a Spanish general and historian. He was a favourite of Charles V., and was entrusted by him with sev. diplomatic missions. His account of the emperor's expedition against the Protestant princes was trans. into several languages.

Aviler, Augustin Charles d' (1653–1700), a Fr. architect, was *b.* at Paris. He was captured by pirates and taken to Tunis, where he designed a mosque. Having been set free, he studied at Rome under Mansard. He designed numerous edifices, including the archiepiscopal palace at Toulouse, and wrote many works on architecture.

Aviles, the anct. Flavignaira, is a seaport of Spain, in the prov. of Oviedo, and 16 m. N. of Oviedo. Manufs. of earthenware, linen, etc.; there are near at hand coal and copper mines. *Pop.* 13,661.

Avion, tn. and com. in the Ribadavia dist. of Orense prov., Spain. Pop. of commune about 5000.

Aviso (Spanish *aviso*, advice, intelligence), an advice boat or small dispatch vessel belonging to the navy. The term is also applied to a kind of torpedo boat.

Avison, Charles (1710–1770), an Eng. composer, was *b.* at Newcastle. He studied in Italy, and afterwards became organist at Newcastle. His works were for a time very popular, and he is mentioned in Browning's *Parleyings with Certain People*. He died at Newcastle.

Avispoort, an opening in the mts. in Damara Land, S.W. Africa, near Little and Great Windhoek.

Avisseau, Charles Jean (1796–1861), a Fr. potter, *b.* at Tours. He was apprenticed to his father, a stone-cutter and potter, until 1816. After suffering privation and poverty, he succeeded in discovering the secret of firing coloured enamels at a high temp., so as to fix the colour permanently with no diminution in durability and beauty, a process which had been lost since Bernard Palissy. He refused to enrich himself by making forgeries of old *objets d'art*. His son Edward succeeded him in the business on his death.

Avitus, Flavius Mæcilius, the date of whose birth is uncertain, was a well-born native of Auvergne. He was prefect of Gaul, and waged successful war against the Huns and the Vandals. After having been ambas. at the court of Theodoric, King of the Visigoths, he became emperor of the W. in A.D. 455 at the death of Maximus. He was, however, deposed after having been on the throne fourteen months, by Ricimer, who appointed him bishop of Placentia. He died in 456.

Aviz, is a Portuguese tn. in the prov. of Alemtejo, situated on a small trib. of the R. Seda bearing the same name. In anct. times it was the seat of the Order of Aviz. Pop. 1500.

Aviz, Order of St. Benedict, was a military and religious order of Portugal, which was founded in 1162 to fight the Moors. It is now simply a military order. It took its name from the fortress of A., to which the order was removed early in the twelfth century.

Avizandum is a Scottish legal term. When the judge, after hearing a case, temporarily withdraws it for private consideration, or for some other

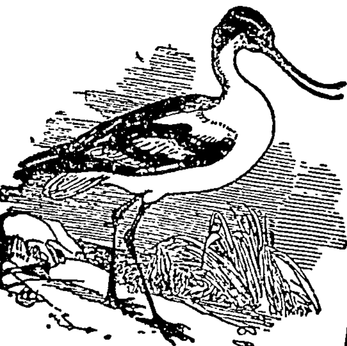
reason, he is said to withdraw it *ad A.* In England he would be said to 'reserve judgment.'

Avlona is a tn. and seaport of the democratic Kingdom of Albania on the bay of Janina, 58 m. S. of Durazzo. It was under the government of Venice until 1691. It is an archiepiscopal see of the Gk. Church, and a station for Lloyd Triestino steamers. Italian demands on Austria-Hungary, as formulated in April 1915, included recognition of her sovereignty over A. At the same time Italy was signing a secret agreement with the Allies whereby, *inter alia*, she was to annex A. and its neighbourhood. In May the Dual Monarchy made a belated offer of the sovereignty of A., together with a free hand in Albania as a whole; but the war spirit in Italy would brook no further negotiations (*see also* under AUSTRIA-HUNGARY). In Dec. 1915 the Italians occupied A., together with Durazzo, but were compelled to evacuate the latter under the fire of the Austrian guns. They successfuly held A., which was thus secured as a base to dominate all the south-central part of Albania. Pop. 6500.

Avoca, or Ovoca, is a short riv. of co. Wicklow, Ireland, formed by the junction of the Avonmore and Avonbeg streams. It runs through exquisite scenery, the 'sweet vale' of Thomas Moore referring to the valley of Avoca.

Avocado Pear is the edible fruit of *Persea gratissima*, a species of Lauraceæ, which grows in the tropics. It is also known as the *Alligator pear.*

Avocet is the name of a widely-distributed kind of bird belonging



AVOCET

he genus Recurvirostra, charac-
sed by its curious curved beak.
The common A. bred in Englan
1824, and is not yet quite extin
the fenny dists. The genus is relat
the snipe family, also a humm
bird.

Avogadro, Count Amedeo, was
1776, and was made professor
physics at Vercelli in 1809, and
mathematics at Turin in 1820.
enunciated in 1811 the hypoth
named after him; that equal volun
of gases at the same temp. and pr
sure contain equal numbers of mo
cules. This hypothesis is an impo
tant part of the 'atomic theory' (*q.v.*

Avoidance of a Benefice. Any offi
is said to be 'avoided' when it be
comes vacant. The avoidance of a
eccles. benefice is caused by death
resignation, cession, or acceptance o
a benefice not compatible, or by de-
privation by the ordinary.

Avoirdupois is the name given to a system of weights and measures applied in Great Britain, Ireland, and the U.S.A. to all goods save metals, precious stones, and drugs.

Avola is a port on the E. coast of Sicily, about 20 m. S.W. of Syracuse. The 'honey of Hybla' comes from this neighbourhood. It produces wine, sugar, and almonds; tunny fishing is carried on, and a trade in agricultural produce. Pop. 17,330.

Avon, a Celtic word meaning river, the name of many British streams, of which the following are the chief: (1) The Upper or Warwickshire A. rises near Naseby in Northamptonshire, and flows through Warwickshire and Worcestershire into the Severn. (2) The Lower or Bristol A., 70 m. long, enters the Bristol Channel 6 m. below Bristol. It is noted for its very high spring tides, which sometimes reach a height of 40 ft. (3) The E. A. flows through Wiltshire and is navigable to Salisbury. It has a length of 50 m., and is noted for the delicate loach. There are also three As. in Scotland, tribs. of the Spey, the Clyde, and the Forth, and two in Wales, which flow into Swansea Bay.

Avondale, a par. of W. Lanarkshire, Scotland, 9½ m. S.W. of Hamilton. Famous as containing the scene of the battle of Drumclog, 1679. *See* Scott's *Old Mortality.* Pop. 5902.

Avonmouth, tn. of Gloucestershire, England, at mouth of Avon, 6 m. N.W. of Bristol. A rapidly increasing port, with extensive docks. Pop. 2949.

Avoury, *see* REPLEVIN.

Avoyer, a corruption of the Lat. *advocatus*, which was applied in general to a lay champion or defender of the church. In Switzerland it came to have as a special meaning the officers who ruled as deputies of the

mperor, and afterwards especially hose employed by the eccles. authority. The title sank into disuse, save t Berne, where its use continued till e revolution of 1794.

Avranches, tn. of Manche, France, n R. Sée, 35 m. E. of St. Malo; pop. 597. It was an episcopal city till 790, the cathedral having been consecrated in 1121. In it Henry II. of ngland received absolution for the murder of Becket. It was destroyed t the time of the first Fr. Revolution. he chief industry is leather-dressing.

Awaji, or Avadst, an is. of Japan, in e strait at the eastern entrance of e Inland Sea between Hondo and hikoku. Much visited by tourists r its beautiful scenery. Chief town waji. Length 30 m.; area 218 sq. .; pop. about 170,000.

Award, the decision of an umpire a submission to arbitration (*q.v.*). o be enforceable, the A. must deterine all the differences at issue and o others.

Awatska Bay, a large basin on the . coast of Kamchatka, between ape Gavaria and Arepooski, the est harbour of the whole peninla. The entrance, which varies in idth from 4 m. to 1½ m., and is surounded by high land, leads into a rger basin with a circumference of m., in which are the three harbours Radkoweena, Petropavlovsk, and areinski. The bottom of the bay is rmed of a soft mud, and is level, hilst the depth varies from 12–14 thoms. Fish are abundant, and e surrounding land is well wooded; e bay is generally frozen over in e winter. The riv. A., at the head the bay, is very rapid, and though quarter of a mile broad at the enance, it soon becomes narrow, and navigable only by canoes. The ghthouse at the N.E. end of the trance is situate in 52° 52′ N. lat. d 158° 47′ E. long.

Awe: (1) Loch in Argyllshire, Scotnd, about 23 m. long and 15½ sq. m. area. It is fed at the N.E. end by e Orchy and Strae. The scenery at is end is very fine, and on a peninla, at high water an is., stands ilchurn Castle. (2) Riv., issuing om the N.W. end of Loch A., and owing about 5 m. into Loch Etive. is an excellent salmon and trout ream.

Awl-wort, the common name for e cruciferous plant, *Subularia uatica*. It is an aquatic plant (*q.v.*), d is an annual; it grows usually in a bmerged condition in lakes and has vl-shaped leaves. It is found in urope, America, and Asia.

Awn, or Arista, a long process orne in a flowering scale (*glume*) of a ass, sometimes popularly called the *beard*. It is often hairy and frequently twisted; it aids in the distribution of the fruit and in its fixation into the ground.

Awomori, or Aomori, a seaport of Japan, on N. coast of Nippon, 444 m. N. of Tokyo. It has a fine natural harbour, and a large trade, mainly local. Pop. 15,000.

Ax, a tn. of Ariège, France, on R. Ariège, 74 m. S.E. of Toulouse. It is noted for its hot sulphur springs, numbering about eighty, with temps. of from 77° F. to 172° F. Pop. 15,063.

Axbridge, a par. and small tn. in Somersetshire, 9½ m. W. of Wells on the Great Western Railway; pop. about 919.

Axe: (1) Riv. of Dorset and Devon, England, about 21 m. long, flowing through Axminster into the Eng. Channel at Lyme Bay. Not navigable. (2) Riv. of Somerset, England, about 25 m. long, rising in the Mendips and entering the Bristol Channel.

Axel, a tn. and fortress in the prov. of Zeeland, Holland, situated 17 m. N.E. by N. of Ghent; pop. 3000.

Axenberg, a mt. in Uri, Switzerland, to the S.E. of Lake Lucerne. Alt. 3670 ft. On a ledge of rock at its foot stands Tell's chapel. The road called the Axenstrasse has been hewn out of the rock, and the mt. is pierced by a tunnel on the St. Gothard railway.

Axestone, a hard, tough, slightly translucent variety of jade or nephrite, greenish in colour, occurring in Cornwall, Saxony, Central Asia, and New Zealand. Used by the Maoris for axe-heads.

Axholme, Isle of, a low-lying dist. of N.W. Lincolnshire, England, cut off by the rivs. Trent, Idle, and Don. Area 47,000 ac. It was probably originally covered with forest, and when this was destroyed, became a swamp, drained 1625–30 by Cornelius Vermuyden. There are still traces among the inhab. of the Flemish settlement at this time. Chief towns, Crowle and Epworth.

Axil, in botany, the upper angle between a leaf and the stem or branch from which it grows. Lateral buds usually grow out from the A., and are accordingly called 'axillary' buds.

Axilla, the anatomical term for the armpit, or pyramidical space between the inner side of the upper arm and the wall of the chest. The apex of the cavity points upward and inward towards the root of the neck, and its extent depends on the position of the arm, being greatest when it hangs at the side. When the arm is raised, the fore and hind boundaries form the axillary folds. The skin of the A. is dark and covered with large sweat-glands and hair. Large nerves and

vessels of the arm pass through it, and there are numerous lymphatic glands.

Axim, a vil. and fort on the British Gold Coast of W. Africa, situated about 2° 15′ W. long. It was acquired from Holland in 1872. It is well supplied with water, and is the healthiest place on the coast. Pop. 3781.

Axinite, the name of a mineral which is a silicate of aluminium, lime, etc., with boracic acid, containing varying amounts of iron and manganese. It derives its name from the fact that the edges of its glassy triclinic crystals bear some resemblance to the edges of an axe.

Axinomancy, an anct. Gk. method of divination, probably for the discovery of crime. Nothing definite is known of its use or method, but in all likelihood it took the form of a trial by ordeal, in which the use of an axe was involved.

Axinus, the name of a genus of fossil Conchifera, some specimens of which are found in magnesian limestone, and one in London clay.

Axiom, a self-evident proposition which may be taken for granted and requires no proof. The use of the word is now practically restricted to the general premises on which the truths of geometry rest. The term [illegible] lid, following [illegible] it to speci- [illegible]

Axis, an imaginary line about which a body rotates, or is symmetrically disposed. The term has many special meanings in the various sciences. It is of frequent use in geometry, *e.g.* the 'A. of symmetry' is the line joining corresponding points in symmetric figures; the A. of a solid is the line about which its angles are symmetrically disposed; the 'transverse A.' of a conic passes through its foci; and there are similar uses in geometric crystallography and physics. In mechanics the term 'axle' has the same meaning. As an anatomical term it denotes the second cervical vertebra, which supports the 'atlas.'

Axis, in botany, is a term which is applied to the root and stem of the whole plant. When a seed has begun to germinate the plumule ascends into the air above the ground, while the radicle descends into the earth. The former is said to be the *ascending A.* of the plant, the latter the *descending A.*, and around these axes of growth all other parts of the plant are arranged.

Axis deer, a species found in India and the E. Indies, somewhat resembling the common European fallow-deer, being profusely spotted with white on a fawn background, shading from almost black on the back to white on the under-parts. The male has slender, pointed horns, not branched. It is easily domesticated.

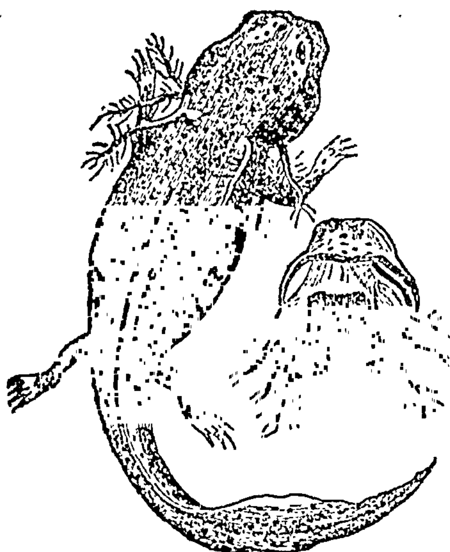
Axius, a riv. of Macedonia, which rises in the mt. [illegible] Scardus and Mt. [illegible] S.E. into the Gul[illegible] called Bardarion [illegible] and the modern [illegible] corruption of it. [illegible] its course it ru[illegible] valleys between [illegible] mouth alluvial deposits have made great encroachments, and the land is [illegible] [int]ersected with [illegible] branch being [illegible] to discover. The entrance is very intricate, but the riv. [illegible] thirty tons [illegible] of the riv. [illegible] year, It is [illegible], but in winter it is deep and rapid, and nearly 2 m. in breadth before reaching the sea.

Axius is the name of a genus of [illegible] Crustacea. [illegible] [whi]ch on the A. [illegible] long, which [illegible] on our coasts. [illegible] of Desmarad, the genus is entirely artificial, and ought not to be separated from the Callianassa.

Axminster, tn. [illegible] land, on R. Axe, [illegible] It was long [illegible] carpets, the manuf. of which was begun in 1755. The industry has now removed to Wilton, and the chief industries of Axminster are the manuf. of brushes, textiles, and leather goods, corn milling, and iron-working. The minster from which it takes its name is said to have been founded by King Athelstan, and it was evidently an important place in early times, standing as it does at the intersection of Iknield Street and the Fosse Way. Pop. 2049.

Axolotl, a larval salamander of the genus *Amblystoma*, found in lakes in Mexico. and the Rockies. It resembles a newt in shape, having a powerful tail, two pairs of weak limbs, and three pairs of simple external gills. In this form it [illegible] freely, laying eggs like a frog's, in [illegible] attached to water-plants by a viscous substance, and [illegible] in two to three [illegible] parents. This [illegible] to be the life history of the species, but from 1865 onwards experiments made at Paris proved that this form is prematurely sexual, and that the Amblystoma is capable of attaining an adult form in which gills and the tail-membrane are lost. The offspring of these, the full As., are gilled. Some kinds of

the species never appear to make this change, which can be favoured or prevented by the conditions of life.



AXOLOTL

Axum, anct. tn. of Tigré, Abyssinia, 85 m. N.W. of Antalo; now mostly in ruins, which include some very fine specimens of Gk. architecture. It was formerly cap. of an Ethiopian kingdom, and, after the adoption of Christianity in the fourth century, an ecclesiastical centre. It is still regarded as a sacred city by the Abyssinians, and the anct. chronicles are kept in the church. Pop. 5000.

Ay, a tn. of Maine, France, on R. Maine, 14 m. S. of Rheims. The chief industry is vine-growing, the tn. being especially famous for its champagne. Pop. 7911.

Ayacucho: (1) Dept. of S. Peru. It is watered by the Apurimac. There was formerly much gold-mining in the dist. Area 18,185 sq. m.; pop. 303,000. (2) Cap. tn. of dept. of same name, 220 m. S.E. of Lima. Pop. 15,000. It was founded by Pizarro in 1539, and the name, originally Guamanga, was changed to A. in commemoration of the victory gained at a small place of that name over the Spaniards in 1824.

Ayala, Adelardo Lopez de (1828–79), Spanish dramatist and politician. He was president of the chamber under Alfonso XII., but his political life was marked by confusing changes of opinions. Chief dramas, *El tanto por ciento*, 1860; *El nuevo Don Juan*, 1863; *Consuelo*, 1878.

Ayala, Balthazar (1548–1584), jurist, son of Don Diego de Ayala, of Burgos in Spain, and of his wife, daughter of an alderman of Antwerp, where Balthazar was *b.* He was made 'auditor' or judge-advocate of the troops of Philip II. in the United Provinces, in May 1580. In 1583 he became also member of the great council and master of requests in ordinary. The only work he published was *De Jure et Officiis et Disciplina Militari*, libri III, 8vo, Douai, 1582. An English trans. has recently appeared in America. He *d.* at Alost, Aug. 1584.

Ayala, Mariano de, General (1809–77), Italian military writer, *b.* at Messina, but forced to leave owing to political reasons, he lived in Tuscany and later at Turin, where he became deputy and then senator. Author of *Vocabolario Militare*, *I Piemontesi in Crimea*, *Biografie de Poërio*.

Ayala, Pedro Lopez de (1332–1407), Spanish poet and historian, *b.* at Murcia. Fought for Henry de Trastamare at Najera, 1367, and was captured by Eng.; later member of council of Henry II. of Castile and high chancellor to John I. His best work is the *History of Castile*, 1350–96, and he also translated Livy into Spanish.

Ayala, Ramón Pérez de, Spanish author; *b.* 1881, in Oviedo, Asturias. His first book, *La Paz del Sendero*, a collection of poems, appeared in 1903. About 12 years later there was a sequel, *El Sendero Innumerable*; and another, *El Sendero Andante*, in 1921. Between the first and second of these he wrote four prose volumes of disguised autobiography: *Tinieblas en las Cumbres*; *A.M.D.G.*; *La Pata de la Raposa*; and *Troteras y Danzaderas*. The theme of the first is the same as that of B. Shaw's *Mrs. Warren's Profession*; the second is an indictment of schooling in a Jesuit college; the third, a study of psychological paralysis. The first of his books to be translated into English was composed of *Prometeo*; *Luz de Domingo*; and *La Caida de los Limones*—all full of an irony recalling Anatole France. In 1921 he published a very popular and humorous novel called *Belarmino y Apolonio*, about two cobblers, one with an artistic and the other with a philosophic ideal. In 1923 appeared *Luna de Miel, Luna de Hiel*; and *Los Trabajos de Urbano y Simona*: one story in two parts. These sustain an ironic criticism of life, found also in the author's essays. *El Ombligo del Mundo* (the Hub of the World), about the petty affairs of a village, appeared in 1924.

Ayamonte, a fortified tn. in the Spanish prov. of Huelva, on the l. b. of the Guadiana; there is a good

harbour, and cod, sardine, and tunny fisheries. Pop. 9741.

Ayasoluk, a vil. in the W. of Asia Minor, 35 m. S.S.E. Smyrna. It is near the ruins of the anct. city of Ephesus.

Aye-aye, or Chiromys Madagascariensis, is a rare and remarkable animal found in the woods of Madagascar. Formerly regarded as a rodent, the memoir of Owen made it clear that it is really an aberrant lemur with many rodent affinities. It is the size of a cat, has rodent-like teeth, and a hairy hand with an exceedingly slender third-finger, which is used to pick out the wood grubs on which it feeds. It is exclusively nocturnal and arboreal in its habits, and is regarded with superstitious reverence by the natives of Madagascar.

Ayeen Akbery, properly Ayin-i-Akbari, the title of a geographical and statistical account of the Mogul empire in India during the reign of Jelâleddin Mohammed Akbar, written by his vizir, Abul Fazl. It constitutes properly the third or concluding part of the *Akbarnameh* of the same author, which gives an account of Akbar's ancestors and his reign down to the forty-seventh year. The *Ayin-i-Akbari* is divided into four parts; the first three are chiefly political and legislative; the fourth part is chiefly statistical and geographical, with an account of the anct. institutions, religion, and literature of the Hindus. Francis Gladwin made a free and abridged translation into English of the *Akbarnameh* (Calcutta, 1783).

Ayenbite of Inwyt, The, meaning 'The Remorse of Conscience,' is a famous translation, made in 1340 by the Augustinian monk, Dan Michel, of *Le Somme des Vices et des Vertus*, by Lorens. Chaucer is supposed to have made use of it for *The Persones Tale;* it is the best example of Kentish Southern English.

Ayesha (610–677), the favourite but childless wife of Mohammed, was *b.* at Medina. On Mohammed's death in 632, she prevented the prophet's son-in-law, Ali, from becoming caliph, and secured the succession for her father, Abu-Bekr. She again tried to prevent Ali on the death of the Calif Othman, but in 656 was taken prisoner. She died at Medina.

Aylesbury, a markt. tn. in Buckinghamshire, 38 m. N.W. of London, and an important railway centre. It is built on high ground, and overlooks the fruitful valley of A. It has many interesting public buildings. The cruciform parish church was built between 1849 and 1867, the corn exchange and markets in 1865, and the county infirmary in 1862. In anct. times it was captured from the British by the Saxons in 571, and in the civil war a battle was fought near here in 1642. Until 1885 it was a parliamentary borough, and with its 'hundred' returned two members. There are printing works, and manufs. of straw plait and condensed milk. The locality is noted for rearing ducks for the London market. A. is the assize town for the county, but Buckingham is the county town. Pop. 12,114.

Aylesbury, William (1615–1656), educated at Christ Church, Oxford. His main work was a translation of Davila's *History of the French Civil Wars* from the Italian.

Aylesford, an Eng. vil. in Kent, 3¼ m. N.W. of Maidstone, on the r. b. of the Medway. The anct. church of St. Peter, which was restored in 1878, has fifteenth century brasses, and an early embattled tower. In the dist. are many monuments of anct. times, including the ruins of a Carmelite friary, cromlechs, and the 'countless stones.' The supposed tomb of Horsa is also to be seen, and here Alfred the Great conquered the Danes. Pop. 3113.

Aylesworth, Hon. Sir Alan Bristol, Canadian Minister of Justice, *b.* Newburgh, Ontario, in 1854; educated there and at Toronto University; called to the Bar, 1878; became a Q.C. 1889; created K.C.M.G. 1911.

Ayliffe, John (1676–1732), was *b.* at Pember, in Hampshire, and educated at Winchester and New College, Oxford. He was an advanced and zealous Whig, and was expelled from the university and deprived of his degrees for stating in one of his works that the funds of the Clarendon Printing House had been misappropriated. His treatise on canon law appeared in 1726, and is still a high authority, whilst his unfinished treatise on civil law is the most elaborate one written in English on Roman law.

Aylmer, John (1521–94), was *b.* at Aylmer Hall, Tivetshall St. Mary, in Norfolk. He was educated at Cambridge, and in 1541 became chaplain to the Duke of Suffolk. Afterwards, when archdeacon of Stow, he was obliged to leave the country on account of his opposition to the doctrine of transubstantiation, but returned to England and resumed his office on the accession of Elizabeth. In 1562 he was made archdeacon of Lincoln, and in 1576 bishop of London. He was avaricious, and notorious for his severe treatment of any who differed from him.

Aylmer, Matthew, Lord Aylmer (1643–1720), British admiral, *b.* in Meath, Ireland; entered navy, 1678; served in Mediterranean till 1688. Commanded the *Royal Catherine* at Beachy Head (1690), and *Barfleur* (1692). In 1693 he became rear-

admiral, in 1694 vice-admiral, and in 1698 admiral. In 1698 he visited the Mediterranean to arrange treaties with Tunis, Tripoli, and Algiers. He was admiral of the fleet from 1709 to 1711, and again from 1714, when he also became governor of Greenwich Hospital.

Ayloffe, Sir John (*c.* 1708–81), an Eng. antiquarian. He was one of the first members of the council of the Society of Antiquaries, and was later made a commissioner for the preservation of State papers. He was author or editor of a considerable number of books, among them a *Calendar of Auntient Charters.*

Aylsham, a parish and mrkt. tn. in Norfolk, 10 m. S.W. of Cromer; has two stations, one on the L.N.E.R., the other on the London, Midland and Scottish Railway. Pop. 2466.

Aymaras is the name of a tribe of S. American Indians. They were in former times the inhabs. of the dist. round Lake Titicaca and the adjacent valleys, but now they form the chief element in Bolivia, though the race is now of very mixed blood. In anct. days the Incas attributed the origin of all Quichua civilisation to the home of the A., which was therefore 'sacred land' to them. The A. undoubtedly appear to have possessed a considerable culture before they were conquered by the Incas in the thirteenth and fourteenth centuries. Evidence exists of their having important cities and palaces, and the ruins of Tiahuanaco show that these were of colossal size. At the time of the Spanish invasion the A. had been under the dominion of the Incas for a considerable time and were to some extent degenerate. They retained, however, the privilege of using their own language, and on the whole their treatment by the Incas suggested that the conquerors believed themselves to be of Aymara blood. The physical characteristics of the two races also are similar. The A. are short and thick-set, with reddish complexion, black hair and eyes, and a rounded forehead. They are of an apathetic and gloomy disposition. They now number about half a million in Bolivia; a few are also found in Southern Peru.

Aymard, or Aymar, Jaques, a Fr. peasant of Dauphiné, was *b.* at St. Veran on Sept. 8, 1662. He was bred a mason, but soon renounced his trade in favour of the profession of a diviner. He used his so-called powers in the finding of wells, hidden treasures, etc., but in 1692 he thrilled all France with his successful tracing of the murderer of a man and his wife at Lyon. A. discovered the criminals, a hunchback, who was broken on the wheel, and two others, who escaped by sea. As a result of this supposed success of his divining powers, A. was taken up by the Prince of Condé, but failed miserably on being practically tested. He then confessed that his powers of divination were non-existent; but the true history of the Lyon affair was never discovered.

Aymer de Valence, Earl of Pembroke (*d.* 1324), son of William of Valence, nephew of Bishop Aymer (*q.v.*). He was appointed guardian of Scotland in 1306; defeated the Scots in that year at Methven, but was defeated by Bruce at Loudon Hill in 1307. He joined the Lancastrian party, and was a fierce opponent of Gaveston, whom he captured in 1312. He left the Earl of Lancaster owing to the treacherous murder of Gaveston, to whom A. had promised his life, and was reconciled to the king. In 1314 he was made lieutenant of Scotland, and fought at Bannockburn. In 1322 he joined in the judgment and condemnation of Lancaster.

Aymer de Valence, Bishop of Winchester, was a half-brother of Henry III., who obtained for him the see of Winchester by putting pressure on the electors. The appointment was in every respect a bad one, for A. was ignorant of Eng., illiterate, and by no means priestly in his mode of life. He repudiated the barons' constitution at the Parliament of Oxford in 1258, and was forced to leave the country. He obtained the support of the pope, however, and was returning when he died at Paris in 1260.

Aymestry Limestone belongs to the Ludlow group of the Silurian system. It is a dark grey concretionary rock, consisting of thin beds. It is named after the vil. of A., in Herefordshire, where it has long been quarried.

Aymon, was the surname borne by four brothers Alara, Richard, Guiscard, and Renard. They occupied a prominent place as heroes of the cycle of romance in the time of Charlemagne. Their exploits were described in a romance written by Huron de Villeneuve in the fourth century, entitled *Les Quatre Fils d'Aymon.* Renard also appears as a leading figure in Ariosto's *Orlando Furioso.*

Ayr, a royal, municipal, and police burgh, and the co. tn. of Ayrshire, Scotland, is a seaport 41½ m. S.S.W. of Glasgow. It is the site of a Roman station, and here in 1197 William the Lion built a castle. Picturesquely situated on the S. bank of the riv., it has a fine bay and beautiful sands, while there are some handsome public buildings. Its manufs. are numerous, and include leather, woollens, carpets, lace, boots and shoes, etc.; there are foundries,

engineering establishments, and saw-mills. The prin. import is timber from Canada and Norway, whilst among the exports are coal, iron, and manuf. goods, and agricultural produce. Ship-building is also carried on, and the harbour has both wet and dry docks. In 1873 the municipal boundary was extended to include Newtown-upon-Ayr and Wallace Town. At Alloway, a pleasant suburb 2¼ m. S. of A., Robert Burns was born Jan. 25, 1759. Pop. 38,933.

Ayrer, Jacob, a Ger. dramatist who flourished in the sixteenth century, rivalled Hans Sach in the copiousness of his output. He was a citizen and legal officer of Nuremberg. His works comprise thirty-six humorous pieces and thirty dramas. His works, both humorous and serious in character, are marked by a vigour of diction and purity of style, but the line of demarcation between the grave and the gay is often not sufficiently clearly defined. He died at Nuremberg in 1605.

Ayrer, John (*fl. c.* 1680, *d.* 1700), was a noted caligraphist; date of birth unknown. Chiefly known as the introducer into Britain of the 'Italian' style of penmanship.

Ayrshire, a S.-western co. of Scotland, is bordered on the N. by Renfrewshire, on the E. by Lanarkshire and Dumfriesshire, on the S.E. by Kirkcudbrightshire, on the S. by Wigtownshire, and on the W. by the Firth of Clyde. Off its coast are Ailsa Craig, Lady Is., and Rhone Is. The surface of the co. is, on the whole, undulating; there is a mountainous region of small extent in the N., and one of larger extent in the S. and S.E. Though none of the rivs. are navigable, they are famed for their varied and calm loveliness. The Ayr is the longest, 38 m. in length; amongst the others may be mentioned the Stinchar, the Girvan, the Irvine, the Garnock, and the Doon, whilst the Afton, the Connock, and the Lugar are known from the poems of Burns. Agriculture flourishes in the co., having made great strides of late years, owing to green-crop husbandry and a more extensive use of manures. The co. is also noted for its dairy products, its cattle, and its horses. It is the prin. mining co. of Scotland, and iron-ore and fire-clay are found in addition o coal. Its manufs. are important, nd include cotton and woollen goods, ce curtains at Galston and Darvel, abinet-making at Beith, ship-buildg at Troon, Ayr, and Irvine, and exnsive engineering at Ayr and Kilarnock. The area of the co. is 1142 m., and its pop. 299,273.

Ayrton, Edmund (1734–1808), the st distinguished member of a race of musicians, was *b.* at Ripo was originally destined for the c but as he showed considerabl cal talent he was made a pupil Nares, the organist of York M He took the degree of Mus. at Cambridge in 1784, the O degree being conferred upon h 1788. He died in Westminster.

Ayrton, William (1777–1858), w in London. He managed the K Theatre in 1817, producing Moz *Don Giovanni* for the first tim England. He was, however, obl to retire owing to the disputes of company. He devoted his life fr that time to literary pursuits.

Ayrton, W. E. (1847–1908), an E man of science, entered the Indi gov. telegraphic service in 1867, a after becoming superintendent, w made an associate of the Royal Socie of London in 1881. He made man improvements in telegraphy, an wrote many books on it. Mrs. A., hi wife, the only women member of th Institute of Electrical Engineers carried out a series of experiments on the electric arc, and was awarded the Hughes Medal by the Society in 1908.

Ayscough, Samuel (1745–1804), *b.* of very respectable parents, and received his education at Nottingham. Owing to family misfortunes he was compelled to labour in a mill, afterwards coming to London as an overlooker of street paviours. He afterwards became an assistant cataloguer to the chief librarian in the British Museum. He is famous chiefly for his index making. He afterwards became an assistant librarian, and took holy orders. Amongst his other numerous works are an index to the *Annual Register*, 1758–80, and an index to the *Gentleman's Magazine*, 1731–86. He also brought out the first Shakespearean concordance. He was appointed to sev. benefices, the last of which was at Cudham in Kent.

Ayscough, William. Very little is known of his early life. He became bishop of Salisbury in 1384, and had great influence at the court of Henry VI. He was the king's confessor in an age when it was most unusual for a bishop to occupy that position. He celebrated the marriage of Henry VI. and Margaret of Anjou in 1445. As a close councillor of the king he was held to be responsible for the evil deeds of the court, and in his own diocese was disliked because of his continual absence. In 1450, after celebrating mass at Edington, he was seized by the congregation, taken to the top of a neighbouring hill and beaten violently to death.

Ayscue, Sir George (*d.* 1671), an admiral of the Commonwealth period. He had been knighted by Charles I.,

but became a parliamentarian and commanded the fleet in the Irish Sea in 1649, being then appointed admiral. At the beginning of the Commonwealth he defeated the Dutch off the Downs, and in 1652 he fought an indecisive engagement off Plymouth. He was superseded in that year, but became commander of the Swedish fleet in 1658, and a navy commissioner on the Restoration. He fought in the second Dutch War, was imprisoned in Holland in 1666-7, and on his return to England did not again take an active part in naval matters.

Aytoun, Sir Robert (1570-1638), poet, *b.* at Kinaldie, Fife. He went to the university of St. Andrews in 1584, and took his master's degree four years later. He then went upon the usual course of travel which was considered part of a noble youth's education, and finally, in the early part of the reign of James I. he settled at the Eng. court, where he was well received. He had previously dedicated a Lat. poem to James I. He received many appointments at the English court, and in 1612 was knighted. He numbered amongst his acquaintances most of the wits of the day, and was an especial friend of Ben Jonson and Hobbes. He was one of the first of the Scottish poets to write with any degree of success in the Eng. tongue, but the poem on which his claim to fame has been chiefly based, *I do confess thou'rt smooth and fair*, has been practically proved not to be of his composition. Most of his poems were extravagant praises of contemporaries. He was buried at Westminster Abbey. Amongst his works may be mentioned *Diophantus and Chandon* and *Inconstancy Upbraided*.

Aytoun, William Edmonstoun (1813-65), Scottish poet, *b.* in Edinburgh. He was descended on both sides from good families, and on his father's side was related to Sir Robert A. (or Ayton) (*q.v.*), who had been a poet himself. He was imbued with his love for Scottish folklore by his mother, who had a great knowledge of Sir Walter Scott's works, and whose knowledge of Scottish ballads was very great indeed. He was educated in Edinburgh at the academy and the university, and at the age of seventeen he pub. a vol. of poems called *Poland, Homer, and other Poems*. He resided for some time at Aschaffenburg, and then returned to Edinburgh and became a writer to the signet, 1835. In 1840 he was called to the Scottish bar, and had a fair practice during the period that he remained there. He pub. a number of poems in *Blackwood's Magazine*, and in 1855, in collaboration with (Sir) Theodore Martin, he pub. the *Bon Gaultier Ballads*, which almost immediately became very popular. In 1845 he became professor of rhetoric and belles-lettres at the university of Edinburgh, and his lectures were so attractive that between the years 1846 and 1865 he raised the number of students from about 30 to 1800. He became sheriff of Orkney in 1852, and in the following year an honorary D.C.L. of the university of Oxford. In 1849 he had married the daughter of Prof. Wilson (Christopher North), but she *d.* in 1859, and four years later he married again. His chief works are *Poland, Homer, and other Poems*, 1832; *The Life and Times of Richard I.*, 1840; *Lays of the Cavaliers*, 1848, a book which ran into 28 eds.: *Bon Gaultier Ballads*, 1855; *Bothwell*, 1856; *Poems and Ballads of Goethe*, 1858; *Ballads of Scotland*, 1870; *Norman Sinclair*, 1861. In addition he contributed much to *Blackwood's Magazine*, and amongst his humorous contributions may be mentioned *My First Spec in the Biggleswades*, and *How we got up the Glenmutchkin Railway*.

Ayub Khan (1855-1914), Afghan prince, son of Shere Ali, formerly Ameer of Afghanistan. Took possession of Herat in 1879 after his father's expulsion from Kabul by the British. In 1881 he invaded Afghanistan in order to win Kandahar and the sovereignty. Defeated General Burrows at the battle of Maiwand, but while hesitating to attack Kandahar, his force was assailed by Sir Frederick (afterwards Lord) Roberts and routed. He renewed his invasion soon afterwards, but after a short-lived success was utterly defeated by Abdurrahman. Ultimately gave himself up to the British, by whom he was sent to India as a state prisoner. He *d.* at Lahore.

Ayuntamiento, the name given in Spain to what is practically the eqivalent of the municipal councils in this country. The establishment of these councils can be traced as far back as Roman times. They acquired great power during the struggles with the Moors, but this power fell into abeyance during the height of the Bourbon rule.

Ayuthia, the anct. cap. of Siam, sacked by the Burmese in 1782, and now called Krung Krao. It was founded in 1351, and during the sixteenth century was a great port, being divided into special divs. for the Chinese, Japanese, Malays, and Portuguese who traded there. It still remains a fairly important tn., the greater part of it being now built on the water. Chief amongst its remaining notable buildings is the Buddhist temple, 'the Golden Mount,' about 400 ft. high. Most of its great buildings are now in a state of ruin.

Azais, Pierre Hyacinthe (1743–96), a Fr. musician, was *b.* at Ladern and *d.* at Toulouse. He wrote especially sonatas and duets for the violoncello.

Azais, Pierre Hyacinthe the Younger (1766–1845), son of the musician, a French philosopher, was *b.* at Sorèze. He entered a monastery, but soon renounced the monastic life. He was at first a warm partisan of the Revolution, but changed his views and was thereupon sentenced to deportation. He took refuge in the Hospital of the Sisters of Charity at Tarbes, where he had leisure for his philosophical studies. After the fall of Napoleon, the gov. granted him a pension of 6000 francs. He died at Paris.

Azalea is a plant now included in the genus *Rhododendron* of the order Ericaceæ, which is a native of the mts. of Asia and N. America. *A. glauca* occurs in clayey swamps of America; *A. pontica* grows in the Crimea; *A. periclimena* the so-called upright honeysuckle, is a native of N. American woods; *A. Indica* is a beautiful Chinese plant. The trailing A. is the sole species of the genus *Loiseleuria*, and is named *L.* (or *A.*) *procumbens*.

Azamgarh, *see* Azimgurh.

Azan, the call to prayer which is proclaimed by the Muezzin from the mosque twice daily in Mohammedan communities. It consists of seven or eight phrases, most of them repeated, to each of which there is a set response to be used by the hearer. The Muezzin proclaims the A. standing at the door or in the minaret of the mosque with his face towards Mecca and his ears stopped by his fingers, and during the proclamation passers in the street must stand still, all work must cease, and even the sick must sit up in bed.

Azandeh, or Niam-Niam, a powerful African negro people, who originally held a large region N. of the Ubangi R. and the water parting between the Upper Nile and the Shari. They rank considerably above the ue negro in intellectual and moral tributes, though they are cannibals, d are distinguished physically by oad, round features, oblique eyes, g, ringlety hair, and a reddish skin. ir hereditary monarchy was deyed by Arab slave-raiders. Pop. 3) *c.* 2,000,000. *See* Schweinfurth's *rt of Africa*, 1873; W. Junker's *els in Africa*, 1890–2.

ani, a name applied to sev. anct. ic peoples. The precise history stock, which seems to have been rthian extraction, is unknown, aces have been found in various of Asia, Africa, and Greece.

nza, Don Joseph Miguel de .826), a Spanish statesman, was *b.* at Aviz. After occupying sev. under Charles IV., he continu office when Bonaparte put Josep the throne of Spain. On the retu Ferdinand after the fall of Napol however, he had to retire into ex

Azara, Don Felix de (1746–18 a Spanish naturalist of the eightee century. Entered the Spanish ar and served for some considera time in S. America, being appoint to 'The Council of Fortifications a Defence of the Two Indias.' His mo famous book, pub. in 1809, was *Trave in South America from 1781 to 1801.*

Azariah, or Uzziah, King of Judah 792–740 B.C., succeeding his father Amaziah. The name is also given as that of sev. minor O.T. characters.

Azay-le-Rideau, tn. in W. France, dept. Indre-et-Loire, 16 m. S.W. of Tours. It has a fine Renaissance château. Pop. 1971.

Azazel, a name found in Lev. xvi. 8, 10, and 26, where it is translated as scape-goat. Reference is made to one goat for Jehovah and one for A., and the antithesis is best conveyed by regarding the translation of A. as Satan, or an evil spirit. By many authorities, however, the word is regarded as being purely impersonal and simply conveying the idea of a 'going far away.' The word was used by Milton as a name given to one of the followers of Satan, his standard-bearer.

'. . . be upreared
His mighty standard. That proud honour claimed
Azazel as his right, a Cherub tall.'
Paradise Lost, i. 534.

Azeglio, Massimo Taparelli, Marchese d' (1798–1866), an It. author, painter, soldier and statesman. He was *b.* at Turin. He was descended from a noble Piedmont family, and at the age of fifteen he went to Rome with his father who had recently been appointed ambas. there. There he became intensely interested in art and music, and although his career as an artist was broken by military service and illness, he became well known as a landscape artist. In 1830 he made the acquaintance of Alessandro Manzoni, the poet, whose daughter he subsequently married. The Revolution in France in 1830 had given impetus to the liberal movement in Italy, and into this movement A. threw himself enthusiastically. He was, however, opposed to the doctrines of Mazzini, who was just beginning his career as an agitator, and advocating republican views. A., however, was imbued with the ideas of constitutional monarchy, and did his best to propagate his doctrines. In 1833 and in 1841 he pub. novels with a political tendency,

Ettore, Fieramosca, and *Niccolo di Lapi* respectively. During this period he also travelled much throughout Italy, trying to create an independent, patriotic, and united spirit. He took part in the battle of Vicenza when the papal troops supported the rebels against Austria, and was wounded in the leg, 1848. After the defeat at Novara he was appointed president of the cabinet by Victor Emmanuel, a position which he occupied until 1852, when he was succeeded by Cavour. At the close of the war of 1859 he was appointed commissioner of the Roman states, a position which he carried out tactfully and successfully. He issued a proclamation which did much to render the people satisfied with the position they had gained. He is remembered as one of the wisest and most successful of Italian statesmen.

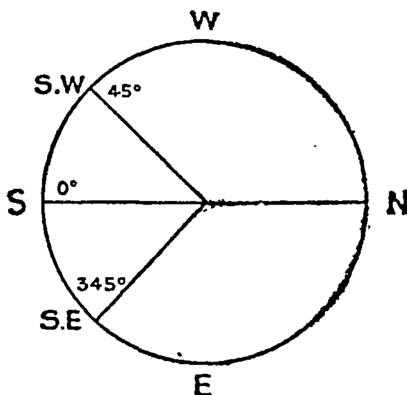
Azerbaijan, called variously Azerbijan and Aderbaizan; anciently called Atropatene. There are two As., one, a Soviet Republic forming part of the U.S.S.R., and the other, a prov. in N.W. Persia. The prov. is separated from the republic by the R. Aras (Araxes). The republic of A. is situated on the S.W. shore of the Caspian Sea, it extends from the Caucasus in the N., to Persia in the S., and from the Caspian in the E., to Armenia and Georgia. After the Great War, the Nationalist party of the constituent assembly of the Tartars of A., having in 1918 acquired the effective voice in affairs, declared the independence of A. on May 28, 1918. Two years later, however, the Bolshevik caucus in the pay of Moscow turned the Nationalist gov. out and voluntarily handed the capital, Baku, to Lenin's troops. The outcome of these events was a treaty between A. and the Russian Soviet Union, declaring A. a soviet republic. In 1922 the republic entered the Soviet Union as a member of the Transcaucasian Federation.

The Soviet Republic's main source of wealth is in the oil-fields of Baku, the annual average output of which is about 500 million poods. Other minerals such as naphtha, manganese, copper, and salt abound and production of them is increasing. The pop., which is chiefly Mohammedan, is now about 2,313,000 (mainly Turko-Tartar), that of Baku being 447,000.

It is very mountainous, one of its mts., Salvan-Dagh, rises to the height of 16,000 ft., and it also contains part of Mt. Ararat. It is very fertile in parts, and produces maize, barley, wheat, cotton, and tobacco.

Azimgurh, Azimghur, or Azamgarh, a tn. and dist. of British India in the United Provs. of Agra and Oudh. The tn. is situated on the R. Tons, a trib. of the Ganges, N.E. of Benares. Produces sugar, rice, indigo, and opium. Inhab. Hindus and Mohammedans. Pop. of dist. about 2,000,000; tn. about 20,000.

Azimuth. The A. of a celestial object is that point in the arc of a horizontal circle intersected by a vertical circle passing through the centre of that heavenly body. Thus, if a star



is due S. it is said to be of A. 0°, but if it is S.W. it is 45° A., or S.E. 345° A. Taken in conjunction with its altitude (*q.v.*), the A. of a star as ascertained by the altazimuth (*q.v.*) fixes its position on the celestial concave.

Azincourt, *see* AGINCOURT.

Azo-Compounds, organic substances containing the group R_1-N=N-R_2, R_1 being an aryl radical and R_2 either an aryl radical or a substituted alkyl. Many A.-C. are important dyes, such as chrysoidine, Congo-red, and methyl-orange, and other members of the group are azobenzene, the amino-A.-C., the oxyazo-compounds, the diazoamines, diazoiminobenzene, the azoxy-compounds, etc.

Azogue, quicksilver.

Azoic (Gk. α, without, ζωή, life), a geological term applied to such rocks as are found to contain no fossils. The constant tendency, however, is for geologists to discover traces of fossils in rocks hitherto considered A. Archean crystalline schists are held by some to form the A. system.

Azore, a stuff like beaver cloth, manufactured in Styria, Austria.

Azores, a group of is. in the Atlantic belonging to the Portuguese. They are called also the Western Is., and are situated between lat. 36° 55′ and 39° 55′ N. and long. 25′ and 31° 16′ W. They were discovered and colonised by the Portuguese between the years 1430 and 1460, but they had been

...they are recorded on some of the earlier mediæval maps. On the is. of Corvo, in the A. group, Punic coins have been discovered, which show that the Carthaginians must at some earlier period have visited it. When the Portuguese rediscovered it in the fifteenth century it was uninhabited, and its present pop. is chiefly of European descent. They were presented by Alfonso V. to his aunt, Isabella of Burgundy, under whose rule a great immigration of Flemings took place. The A. consist of nine is., which fall into three groups; the central group is composed of the is. of Terceira, São Jorge, Pico, Fayal, and Graciosa; the north-westerly group of Flores and Corvo; the south-easterly group of São Miguel, and Santa Maria. The is. are of volcanic origin, and present a very picturesque though somewhat rugged appearance. A number of them still suffer from periodical volcanic eruptions, and the surface of the is. consists to a very great extent of lavas and basalts. The highest peak in the is. is Pico Alto, which reaches the height of 7613 ft. São Miguel is the largest of the is., and is also the most populous and the richest; it has an area of 299 sq. m. Ponta Delgada, situated in this is., is the largest port of the whole group. The cap. of the Azores is Ancra in the is. of Terceira, which tn. is also a port. Horta, in the is. of Fayal, is also a port; but unfortunately there are no good harbours. Sugar-cane, coffee, and tobacco are grown and tropical fruits of all kinds including bananas and olives. The chief exports of the is. are oranges, wine, brandy, lemons, and corn, most of which are exported to Great Britain or Germany. They export also pork, salt beef, and coarse linen. The climate is mild and healthy, and the A. are rapidly becoming a winter resort; the average temp. is about 60°. Most of the flora of the is. is European, only about forty plants out of a known 500 species being indigenous. The name A. was given by the Portuguese to the is. because of the numbers of hawks found there (Portuguese *açor*, hawk). Area of the group, 920 sq. m. On Aug. 31, 1926, the city of Horta was much damaged by an earthquake. Pop. 259,000.

Azorin (real name, José Martinez ...), Spanish author; *b.* 1874, at Monovar in Alicante. As a boy, contributed anarchistic articles to a paper conducted by Blasco Ibáñez. His first book was an essay on Moratin, 1893. In 1902 he took the name Azorin. In those days he gained notoriety by his literary iconoclasm—a sort of Spanish Bernard ... He has written three ... novels: *La Voluntad*, 1902; *Antonio Azorin*, 1903; and *Las Confesiones de un pequeño filósofo*, 1904; ... 1922 he published a kind of ... called *Don Juan*. But he ha... the novelist mind; he can sim... simulate creation; he is an obse... and the critical essay is his f... He has written on ancient Castile...

Azote (Gk. *a*, without, ζωή, l...), the name given at one time alm... universally to nitrogen, from the ... that uncombined with oxygen it ... fatal effects on animal life.

Azotised Bodies are substanc... which contain nitrogen and form pa... of the structure of plants and animal... such are albumen, casein, gelatin... etc. They are so called becaus... 'azote' was the name formerly give... to nitrogen (*a* signifying deprivation... and ζῶτος = living), because no lif... could exist in it.

Azotus, *see* Ashdod.

Azov, a Russian tn. on the southern bank of the Don, about 20 m. from the mouth of that riv., it is also about 25 m. E. of the tn. of Taganrog, its trade rival. It is a great fishing centre, and to a certain extent the outlet for the produce of South-eastern Russia. It is identified with the anct. tn. of Tanaïs, near which site A. was built and the mediæval tn. of Tana. Captured first by the Russians in the tenth century, it did not become a part of Russia until 1774, although it had previously been captured by Peter the Great from the Turks (1696). It was bombarded by the allied army during the Crimean War. Pop. 27,000.

Azov, the Sea of, a northern arm of the Black Sea with which it is connected by the Strait of Yenikale, or Kertch, about 28 m. long and very narrow, not exceeding 4 m. in breadth at its widest part. The anct. name of this strait is Bosphorus Cimmerius. To the W. of the S. of A. and separated from it only by a long narrow sandy peninsula called Arabat is the Sivash, or Putrid Sea, a series of lagoons and marshes. To the Roms. the S. of A. was known as the Palus Mæotis, the name being given to it from the people who dwelt on its banks, and who, in their own tongue, called it the Mother of Waters. By the Turks it is known as the Balük Denis, or Fish Sea, owing to the number of fish which are found there. There is supposed to have been prehistorically a connection between the Caspian Sea and the S. of A. It lies between lat. 45° 20′ and 47° 18′ N., and long. 35–39° E. Its greatest length is a little over 220 m., and its average breadth is about 80 m.; its total area just exceeding 14,000 sq. m. It is re-

markably fresh, although this freshness differs in various parts of the sea owing to the various currents. The depth varies from 3 ft. in some places to 50. Its greatest trib. is the R. Don, and in fact the deepest part of the lake forms a continuation of the Don basin. It has a number of important tns. on its banks, but its lack of commodious harbours prevents it from obtaining all the trade which it might have. Amongst important tns. on the S. of A. may be mentioned Taganrog, Berdiansk, Mariopol, Yenikale, and Kertch.

Azpeitia, a Spanish tn. in the prov. of Guipuzcoa. About 16 m. S.W. of San Sebastian. Just outside this tn. was born in 1491 the famous founder of the Society of Jesus, Ignatius Loyola. The house is still preserved within the walls of the famous Loyola Convent. Pop. about 7000.

Azrael, also called Raphael, and identified with Gabriel, Michael, and Uriel as the four archangels 'who go in and out before the glory of the Holy One.' In Moslem mythology he is the angel of Death, regarded in a very similar manner to Fate. Jewish tradition has made him almost an evil genus.

Azrek, or **Bahr-el-Azrek**, or the Blue Nile, rises near Lake Dembea, or Tzana, in Abyssinia, at an elevation of 7000 ft. It unites with the White Nile, Bahr-el-Abiad, at Khartum. Its length is about 900 m., 500 of which are navigable at high water. In Abyssinia it is called Abai.

Aztecs, The, are the best known of the numerous tribes which inhabited Mexico. Their early history has been elucidated by Humboldt, and the story of their wanderings is told in their picture-writing. They appear to have been of the same origin as certain Asiatic tribes; according to their history, they came from a pleasant land, Aztlan, somewhere to the N.E., leaving it probably about the seventh century A.D. They wandered towards the S.E., led by their priests, leaving settlements which are distinguishable now. Finally, about 1200, they settled at Chapultepec, at the foot of the volcano Popocatepetl. However, their savage customs were resented by the tribe of the Chichemecs, and they were driven to the lagoons, but a hundred years afterwards they gained their liberty. Led by their priests, they chose a site for and built their cap., Tenochtitlan, also called Mexico, from the name of their god Mexitili. From this god, also the A. were called Mexicans, which name was afterwards applied generally to all the inhab. of the country. In this place they built up a magnificent civilisation, and by means of alliances and wars extended their empire over the greater part of what is now modern Mexico. Their later emperors, the Montezumas, were said to possess such wonderful treasures that they have been considered types of magnificence, though it is probable that the greater part of this is due to tradition. Their religion included the sacrifice of human beings taken from prisoners of war. They were an agricultural people, had an elaborate system of irrigation, and studied astronomy. According to their belief, time was divided into cycles of fifty-two years, the close of each cycle being supposed to portend some grave national disaster. During the last five days of each period, they observed various religious ceremonies, intended to avert this catastrophe; immediately afterwards they gave themselves up to rejoicing. The last time that this ceremony of 'tying up the years' was observed was in 1506. The last of the Montezumas succeeded in 1502. The A. were now at their greatest height, but they were feared and hated by all the surrounding nations, and this king, by carrying out a policy of wanton aggression and by the use of human sacrifices, increased this enmity. Rumours of the approach of the Spaniards had already reached Mexico. In 1517, emissaries of Velasquez, governor of Cuba, penetrated far enough to see some of the glories. Hence, in 1519, Hernando Cortes began his famous expedition, which ended in the conquest of Mexico. He destroyed the greater part of the ships of Montezuma and advanced inland. Montezuma sent him gifts, and ordered him to return. Cortes replied insolently, and then proceeded to take advantage of the isolation of the A. He conquered and Christianised Tlaxcalla, a small republic at enmity with Montezuma, and then advanced. Montezuma was forced to submit, and died in 1530. Cortes was driven back for a time, but returned and besieged the cap., Mexico, for eighty days. With its fall comes the end of the native history of Mexico.

Azuaga, a tn. of Badajoz, Spain, 20 m. E. of Llerena in the centre of the silver lead mining district. It has valuable Rom. remains. Pop. 16,580.

Azuay, a southern prov. of Ecuador lying to the N. of Loja, and extending to the R. Amazon. It takes its name from the mt. knot lying to the W. called A. It is fertile and well watered. The capital town is Cuenca. Area about 4000 sq. m.; pop. 132,400.

Azul, the name of a tn. and dist. in the prov. of Buenos Aires in the Argentine republic. The tn. is the centre of a colony of Italians and

Basques. The dist. has a pop. of about 20,000, the town 10,000.

Azulai, Haim Joseph David (1724–1807), Jewish bibliographer, *b.* at Jerusalem, but spent most of his life at Leghorn. Compiled the *Shem-ha-Gedolim* (Name of the Great Ones), a catalogue of Heb. writers and their works.

Azulejos, the name given to a peculiar blue tile which was made by the Mohammedans of Persia, Egypt, and Spain. The manuf. was learnt by the Spaniards from the Moors, and kept up after the conquest of Granada had driven the Moors from Spain. So skilful did the Spaniards become in the manuf. of these tiles that it is not easy to distinguish the Spanish made from the Moorish made tile.

Azun, sometimes called the 'Eden of the Pyrenees,' in the S.W. of dept. Hautes-Pyrénées. Watered by a trib. of the Gave de Pau.

Azuni, Dominico Alberto (1749–1827), a distinguished writer on international law, and jurist. He was *b.* at Sassari in Sardinia. He studied law at Sassari and Turin, and at the age of thirty-two was made a judge of the consulate at Nice. He pub. his general dictionary of mercantile jurisprudence in 1788, and in 1795 a book on the growth and progress of maritime law in Europe. He was appointed by Napoleon to be one of the commissioners engaged in drawing up a new commercial code, and in 1807 he became president of the Court of Appeal at Geneva. After the fall of Napoleon he went into retirement until he was recalled and made a judge at Cagliari by Victor Emmanuel I.

Azure, the word used technically to denote blue in heraldry. This ... is always used in describing the escutcheons of those beneath the rank of a baron. It is represented by horizontal lines in engraving arms.

Azurine, or Blue Roach, a variety of the rudd, or red-eye, distinguished by its slate-blue back, silvery-white abdomen, white fins, and straw-coloured iris to the eye. It belongs to the large family technically Cyprinidæ, but some naturalists make it a distinct species. It is found all over the Continent, and has been introduced into England, not with very great success, although it is sometimes found in Lancashire. The fish is small and hardy, affords good sport, and has firm, well-flavoured flesh.

Azurite, a name given to the stone which is also known as lazulite. This stone, together with lapis lazuli, and mineral turquoise, is given the generic name of Azure Spar. It is a brittle, transparent mineral, with monoclinic crystals. It occurs in England in Derbyshire, Devonshire, and Cornwall, and in many parts of the Continent, such as France and Austria.

Azym, unleavened bread eaten by the Jews at the Passover.

Azymites, the name given by the orthodox Gk. Church to the adherents of the Western Church who used unleavened bread in the observance of the Lord's Supper. The patriarch of Constantinople attacked the Western Church on this point during the eleventh century.

Azzo, sometimes called Azo and Azzolenus. A professor of civil law in the university of Bologna during the thirteenth century. He has left us his *Readings on the Code*, which is considered by Savigny to be the most important contribution of his school.

B

B is the second letter of the anct. and modern Rom. alphabet. It is the exact counterpart of the Gk. 'Beta,' represented in Hebrew and Phœnician by 'Beth.' In the 4th century A.D. B in Gk. came to correspond in power to V, and hence, in the Russian and other European languages derived from mediæval Gk., B does not represent the Rom. letter in position and power. The sound the letter represents is the sonant labial mute or lip-voice stop consonant, *i.e.* the sound produced by closing the lips and vibrating the vocal chords. B tends to exchange value with M, P, V, or F. The symbol which represented the sound passed through various forms before it was adopted from the Phœnicians by the Gks. The minuscule form *b* is derived from the form B through the dropping of a loop. The symbol *ℬ* is a cursive form of the letter, and is evolved from B by imperfect junctions of the loops. In the Aramean alphabet the loop tended to open, and in some forms a loop was lost entirely, as in the Hebrew form ב which was evolved from a square looped B through the disappearance of one of the loops. The numerical value of B is usually 2.

B, in music. In Eng. music B represents the 7th degree of the diatonic scale of C, but in Ger. music H represents the Eng. B, while B represented the Eng. B flat. The musical signs denoting flat and natural are modifications of the letter b, *i.e.* the sign ♭, denoting flat, is a b with a slightly pointed loop, and the sign ♮, denoting a natural, is a b with a square loop. These signs are used because B was the first note of the scale to be modified by semitone.

Baader, Benedict Franz Zaver (1765–1841), a Ger. Roman Catholic speculative theologian and philosopher, *b.* at Munich. He studied medicine at Ingolstadt and Vienna, graduating in 1784. During his stay in England (1791–6) he became acquainted with the work of Hume, Boehme, Eckhart, and Saint Martin. He became an engineer by profession, and was superintendent of the Bavarian mines (1817–20). He was appointed professor of philosophy and theology at Munich (1826). The rationalism of Hume repelled as much as the mysticism of Boehme attracted him. His philosophy is based on the doctrine of the Catholic Church and is religious rather than ethical. His writings are metaphysical and obscure in tone, but he is considered by many to be the greatest Roman Catholic thinker of modern times. His opposition to the interference of the Roman Catholic Church led to an interdict forbidding all laymen from lecturing on the philosophy of religion (1838). His collected works were pub. at Leipzig (1851–60) in 16 vols., vol. xv. containing his life by F. Hoffmann. A selected edition, ed. by Claassen, was issued in 2 vols. (1886–7). *See* Hoffmann, *Biographie und Briefwechsel*, 1887, and Welzer and Welte, *Kirchenlexikon*, vol. i. 1877.

Baal, the chief male deity of the Phœnician and Canaanitish nations. Worship of B. began as a god of the sun, but later he was regarded as having a certain sway upon the morals. The first peoples to worship him adopted a form of nature worship on mt. tops. Those mts. included Horeb and Sinai, where the Midianites and Amalekites congregated respectively; Mt. Peor, used by the Moabites; Carmel, chiefly used by the Phœnicians; and Hermon, where the Canaanites of the interior met. B. stood for the life-giving power of the sun, while Moloch represented the sun's destructive influence. Later both were united under the name Melkart, who became the supreme Phœnician deity. The word B. is found in many names of persons and places in Hebrew, Chaldee, and Phœnician, *e.g.* Jezebel, Hasdrubal, Hannibal, Baalbek. B. is not to be confounded with Beal, a Celtic deity.

Baalbek, an anct. city of Syria. The ruins stand 35 m. N.N.W. of Damascus and 38 m. S.S.E. of Tarabulus. The name means 'Baal's City.' During its occupation by the Gks., it was changed into Heliopolis. It lies at the opening of a small valley in the plain of Cœle-Syria (El Bukâ'a), a dist. of pleasing appearance, and occupies a position 4500 ft. above sea-level. Of all Syrian cities B. was foremost among them for the beauty of its buildings and the splendour of its streets. It is remarkable now for the magnificent ruins it possesses, among

which one specially noteworthy is the Great Temple, the finest building in the city. The columns of the entrance measure 88 ft. in height and 22 ft. in circumference. Originally there were 54 columns, of which 6 are now standing, while the ground is strewn with the ruins of the remainder of the structure. A smaller temple stands to the S. of this, and is larger than the Parthenon at Athens. Both are built of limestone. The actual history of B. is in its beginning difficult to trace. Without doubt it was used, as its name indicates, as a temple of Baal. Under Julius Cæsar it was made a Rom. colony. In the 2nd century it was renowned for an oracle, and Trajan is said to have been sufficiently impressed with its powers to consult it before embarking upon his second Parthian war. The Great Temple was built by Antoninus Pius (A.D. 138–161), though the inhab. to-day attribute its erection to Solomon. Theodosius the Great converted it into a Christian church on the establishment of that religion. During the wars which followed, it was used as a fortress by the Arabs, traces of which are yet visible. In 1400 the city was completely sacked by Ben Timur. To-day the inhab. live in a state as wretched as the anct. city was once opulent, and its pop. is numbered in hundreds.

Baan, John de (1633–1702), a Dutch portrait painter, *b.* at Haarlem. He was taught by his uncle, Piemans, a disciple of Velvet-Breughel, and afterwards studied under Bakker at Amsterdam. B. followed Vandyck as his master of style. By invitation of Charles II. he came to England and painted portraits of the king and queen and many of the nobility. On his return to The Hague, he executed portrait of the Duke of Toll, which rought him 1000 Hungarian ducats. e also worked for the Duke of Tusany, who placed a portrait of the tist in the gallery at Florence; and ouis XIV. consulted him frequently the purchase of pictures. B.'s best ce of work is, probably, the port of Prince Maurice of Nassau. died at Amsterdam.

aasha, an Issacharite who slew lab, son of Jeroboam I., at the istine tn. Gibbethon, afterwards ng all the rest of Jeroboam's ly. B. thereupon became King of l (*c.* 914 B.C.), and prosecuted an otic policy against Asa, King of h. By building Rama, he hoped t off Jerusalem from the outer , but Asa procured the help of B. was buried at Tirzah, the esidence. *See* 1 Kings xv. 27 7.

or Bab-ed-Deen, *see* BABI.

Baba: (1) A corruption of pa father, applied as a title of distinc in Persia and Turkey to dignitar especially of the ascetic life. (2) B (the old woman), the name of favourite character in Slavonic mythology, represented as an old witch hag with a hooked nose, promine teeth, and grey dishevelled hair.

Baba (*fl.* c. 1240), a Turkish impostor, or prophet, who devastate Asia Minor and was killed by th combined forces of the Turks an Christians.

Baba, Cape, a frowning prominence near the western point of Anatolia. The Gks. called the cape Lectum, and it was important in classical times as separating Troas from Æolia. On the promontory stands the tn. of B., which has pop. of about 4000.

Baba Sudai Abiverd (1369–1449), a noted Persian poet, *b.* at Abiverd in Khorassan. He sent a poem, exposing a certain band of robbers who had made repeated attacks upon his native city, to the Sultan Shah Rokh, who listened to his complaint and redressed the wrong.

Babahan, or Behbehan, a Persian tn., 130 m. N.W. of Shiraz in the prov. of Khuzistan; pop. about 6000.

Babahoyo, or Bodegas, cap. of prov. Los Rios, Ecuador, S. America, on the R. Guayas. It is about 45 m. N.E. of Guayaquil, and is the busy trading-centre for this city and Quito; pop. about 7000.

Babatagor, or Babadagh, a tn. situated in Roumania, cap. of the Dobrudsha; has a considerable Black Sea trade; pop. 4000.

Babbage, Charles (1791–1871), Eng. mathematician, *b.* at Totnes, Devonshire, and promoter of an important Eng. mathematical revival. He observed that mathematical calculations were greatly impeded by the use of imperfect logarithm tables, and he devoted his attention to the construction of a correct table of logarithms (pub. 1827). The ruling passion of his life, however, was the idea of construction of a great calculating machine. The gov. contributed £17,000 in aid of its construction, and B. himself expended £6000, but the machine was never completed, owing to disagreements between the constructor and the gov. The imperfect machine is now preserved in the S. Kensington Museum.

Bab Ballads, a book of clev satirical jingle written by Sir W. S Gilbert.

Babbacombe, a vil. in Devonshire 2 m. N. of Torquay. It is a favourite resort of summer visitors. Gained much notoriety from the fact that the criminal Lee, who committed a murder at B., was thrice placed on the

scaffold, the trap-door of which refused to work. Lee's execution was postponed, and subsequently commuted to penal servitude. Pop. 3088.

Babel, Isaak, *b.* in 1894 in Odessa of Russian Jewish parents. At the wish of his father, he studied until he was seventeen Hebrew, the Old Testament, and the Talmud. Afterwards attended a business school in his native town, where he learned to speak and write French. Came to St. Petersburg in 1916, where he succeeded in getting some of his stories printed by the great Maxim Gorki in his magazine. Gorki, however, told him to see life before he tried any further writing. From 1917 to 1924 B. led a life of adventure. He was soldier on the Rumanian front, an officer in the Tcheka, soldier in the army against Judenitch, only Jew who ever served in a Cossack regiment, and reporter in St. Petersburg and Tiflis. He then resumed writing and his *Red Cavalry*, dealing with his experiences as a Cossack, has been translated into most modern languages.

Babel, Tower of, according to the legend of the book of Genesis (chap. xi.), a tower built by the inhab. of B., with the intention of scaling heaven. The Almighty in the narrative miraculously intervenes, and the builders are punished for their presumption by having their speech confounded. The legend thus endeavours to account for the diversity of speech among the different nations of the world, and probably arose from a misunderstanding of the etymology of the word B. B. (Assyrian *Bab-ili*) is the native name for what appears as Babylon in the Gk., and signifies 'Gate of God.' It has no connection with the Heb. word *bālal*, signifying 'to confound.' The student of comparative mythology will readily see an analogy between this legend and the Gk. myth of the Titans who attempted to scale heaven by piling Pelion on Ossa. Various sites of the tower have been suggested, *e.g.* Birs Nimroud near Babylon and Amran within the city. Later interpretation contends that the words 'its top shall be in the heavens' means no more than 'very high' and that the purpose of the tower was to serve as a rallying point for the inhabitants of the plain in the land of Shinar. (Consult T. B. Pinches' *The Old Testament in the Light of the Records of Assyria and Babylonia,* and the *Internat. Standard Bible Encyclopædia*). The remains of 'the Temple of the foundation of heaven and earth' called by Nebuchadnezzar the Ziggurat Babili, or Tower of Babylon, towered high above the surrounding plain within the memory of men yet living. The burnt bricks of which it was composed were all, it is said, cleared out in order to use them for the repair of the Hindiyeh canal. We cannot, however, be certain that this Tower of B. included or stood on the site of the migdol or watch-tower in question, although it was built of similar materials.

Bab-el-Mandeb, or 'The Gate of Tears,' from its dangerous currents, is a strait separating Arabia and Africa. The Red Sea is joined to the Gulf of Aden by it. On the E. side it is called the 'Little,' and on the W. the 'Great' strait.

Babelthuap, the chief is. in the Pelew group, or W. Carolines, in the Pacific Ocean, being about 30 m. in length. It has a fertile soil, and is subject to volcanic eruptions. Pop. 6000.

Babenberg, the name of a princely Ger. family which came from Franconia, near Bamberg, and flourished from *c.* 980–*c.* 1246. The most noteworthy member of the family was Leopold I., surnamed the Illustrious, who became margrave of Austria, 960.

Baber (Zehir-Eddin Mohammed) (1495–1530), the first Great Mogul of India. He was *b.* in 1483, and was a descendant of Timur. When twelve years of age he succeeded Omar Sheikh Mirza to the rule of the dominions lying between Samarkand and the Indus. Strife ensued owing to the usurpation of an uncle and the revolt of some of the nobles. With surprising courage and determination, however, the young ruler seized and held the provs. of Kashgar, Kunduz, Kandahar, and Kabul. Delhi and Agra speedily fell before the impetuosity of his attack. But his reign as Mogul was short, for he died after having reigned five years. Not only were his talents remarkable in civil and military gov., but he possessed also a passion and genius for science and art, and to his many achievements of administration in the improvement of roads, the measuring of land, the levying of taxation, and postal organisation is to be added a history of his life and conquests written in the Tartar language. The eldest of his four sons succeeded him to the throne at Delhi.

Baber, or **Babber Islands,** in the Dutch E. Indies, belonging to the residency of Amboyna. *See* SUNDA ISLANDS, LESSER.

Baber, Edward Colborne (1843–90), a Chinese scholar and traveller. He was born at Dulwich, educated at Christ's Hospital, and graduated from Magdalene College, Cambridge, in 1867. He went out to Peking as a student interpreter, and became a

first class assistant in 1872. In 1879 he became Chinese secretary of the legation at Peking. He made three journeys into the interior of China in 1876, 1877, and 1878, which he described in *Travels and Researches in Western China*, 1886; *Chinese Tea Trade with Thibet*, 1886, which appeared in the Royal Geographical Society's *Supplementary Papers*, and was awarded the medal of the society. He was consul-general in Korea (1885–6) and political resident at Bhamò on the Upper Irawadi from 1886 till his death. *See* the *Proceedings of Royal Geographical Society*, 1883, 1886, and 1890.

Babeuf, François Noel (1760–97), a communist and journalist of the Fr. Revolution. He adopted the title of Gracchus B. as editor of a paper called the *Tribune of the People*, uncompromisingly communistic in principle. He was guillotined for an attempt to overthrow the Directory and establish communism.

Babi, or Bahais, the believers of a modern Persian sect founded by Mirza Ali Mohammed, who was *b.* at Shiraz in 1819, and who adopted the title Bab-al-Din, 'Gate (or intermediary) of the Faithful,' and shortened into Bâb. The religion of the B. is eclectic, containing germs of what is best in Mohammedanism, Judaism, Christianity, and Parseeism. The life of the Bâb was one of great trial and hardship, and the wide influence that his teaching had is remarkable when one considers how hotly the persecution raged. The Bâb made several pilgrimages to Mecca and other sacred places, and was believed by many to be the Mahdi promised by Mohammed to save the nations. Both orthodox Moslems and state conspired to overthrow him, and as a result he spent the greater portion of his teaching life in prison, *e.g.* his imprisonment at Shiraz, at Maku, and Chihriq, but during the periods of his incarceration his followers zealously carried on his work of proselytisation. The Bâb was finally shot before the eyes of the people in front of the citadel at Tabriz (*c.* 1850). The body was recovered by his followers and enshrined at Jehram, and subsequently conveyed to Acre in Syria, where it now rests. Nor was the rage of the persecutors against the followers of the new prophet less violent. After the death of the Bâb his adherents were deported to Constantinople and Cyprus, but in spite of oppression Babiism still prevails in many parts of Asia and America. The number of martyrs to this creed is more than 20,000, and its adherents in Persia alone are estimated at about 2,000,000. In U.S.A. alone there are several thousand Bahais. Bahais are drawn from other faiths in this proportion, two thirds from the Mohammedan world and the remainder from the other great world faiths. The leadership of this sect was assumed in the sixties by Baha'u'llah, a Persian nobleman, who in prison at Acre wrote many books. Chief among [illegible] he *Kitab-* [illegible] and was [illegible] by Abdul [illegible], on the [illegible] Haifa; and who, on charges of disaffection to the Gov., was imprisoned in 1907. He obtained his liberty at the revolution of 1908. In 1911–13 he toured Europe and America—preaching, with t[illegible] and with great [illegible] American femini[illegible] [illegible]eat War, he an[illegible] re under strict supervision by the Turks at Haifa, where he was energetic in averting famine. Haifa was taken by the British, Sept. 23, 1918; and Abdul Baha was knighted April 27, 1920. He *d.* Nov. 28, 1921, aged 77. His will appointed, as Guardian of [illegible] [illegible]ns of [illegible] are progressive and not final. Thus Mohammed was a great prophet and his doctrines were a revelation of God, but [illegible] final prophet [illegible] infallible. The [illegible] is high. Man is regarded as an emanation from God, and as such is immortal in spirit, but the tenets of Babiism vary on the subject of individual immortality. Sometimes the individual soul co-exists with the Deity for all time; sometimes the soul is re-absorbed into the divine essence whence it emanated. At death the body and soul are disunited. Polygamy and concubinage are forbidden, and woman is held in high esteem as being the spiritual equal of man. While he denied the religious value of a life of consistent self-abasement and asceticism, he did not advocate a life of licence. He [illegible] realise the Gk. [illegible] 'golden mean' [illegible] pleasures. Babi[illegible] on the intellect [illegible] tions, and is a philosophy of life rather than religion of the soul. The modern Bahais are said to number about 700,000 in Persia, with small groups in European countries and,

[illegible] by Pulo, form a [illegible] rchipelago.

[illegible] (1561–86), Eng.

Catholic conspirator, son of Henry B. and Mary, daughter of Lord Darcy. He acted as a page to Mary Queen of Scots when a prisoner at Sheffield, to whom he soon became strongly attached. In 1580 he became an attendant at the court of Queen Elizabeth, and in 1586 one of the chief promoters of a far-reaching conspiracy. The plot had for its object the assassination of Elizabeth, the liberation of Mary, and the reorganisation of the constitution in Catholic interests. B., in order to have lasting testimony of his own importance in the conspiracy, entered into correspondence with Queen Mary regarding the progress of the plot. The letters were discovered and the conspiracy was betrayed. B. tried to escape, but was arrested, tried, and condemned to death. His conduct at this was characterised by extreme cowardice. He wrote despicable letters to Queen Elizabeth begging redress, but to no avail. The discovery of this plot was the chief cause of Mary's own execution.

Babington, Benjamin Guy (1794–1866), physician and linguist, *b.* in Guy's Hospital, London, where his father was resident apothecary. In early life he entered the navy and served at Walcheren and Copenhagen. He left to join the Indian Civil Service, and was appointed to the Madras presidency. He distinguished himself as an oriental scholar, and trans. into Eng. the Tamul-Lat. grammar of C. J. Beschius. He was obliged to leave India on account of his health, and thereupon studied medicine. He became fellow of the Royal Society, and in 1861 president of the Royal Medical and Chirurgical Society. B. contributed numerous valuable papers to the Guy's Hospital *Reports*, pub. many translations, chiefly on oriental or medical subjects, and ed. a translation of Feuchtersleben's *Medical Psychology* for the Sydenham Society, 1847. See *Lancet*, April 21, 1866.

Babington, Charles Cardale (1808–95), a scientist and professor of botany at Cambridge. Wrote many books on natural science, including a manual of *British Botany* (8th ed., 1881); *Flora of the Channel Islands*; and *Flora Bathoniensis*. He left his library and herbarium to Cambridge University. See *Memorials, Journal and Botanical Correspondence of C. C. Babington*, ed. by Anna Maria Babington, 1897.

Babington, Churchill (1821–89), classical scholar, scientist, and archæologist, *b.* at Roecliffe, Leicestershire. At the age of seventeen he studied under Charles W. Goodwin, the orientalist and archæologist. He distinguished himself at Cambridge, and graduated in 1843. He held the Disney professorship of archæology at Cambridge, 1865–80, and lectured chiefly on Gk. and Rom. pottery and numismatics, illustrating these lectures from his own valuable collection of coins and vases. He was, moreover, an authority on botany, ornithology, and conchology. He catalogued the classical MSS. in the University Library and the Gk. and Eng. coins in the Fitzwilliam Museum. His fame as a classical scholar is based on his ed. of Hypereides' speeches (*Against Demosthenes*), 1850; *On behalf of Lycophron and Euxenippes*, 1853; and *Funeral Oration*, 1858, from the papyri discovered at Thebes in 1847. His other works include *Flora of Suffolk* (with W. M. Hind), 1889; *Roman Antiquities found at Rougham*, 1872; an ed. of Higden's *Polychronicon*, 1858; and of Peacock's *Repressor of overmuch Blaming of the Clergy*, 1860.

Babington, Francis, an Oxford divine. In 1559, Dr. B. was appointed master of Balliol. His conscience does not appear to have stood in his way, for he received many eccles. preferments. Leicester chose him to preach Amy Robsart's funeral sermon at St. Mary's in 1560, but later he appears to have lost his patron's favour. He was suspected of being a secret papist, was obliged to resign from the rectorship of Lincoln College, 1563, and in 1565 fled to the Continent, where he died about 1569.

Babington, Gervase (1550–1610), successively bishop of Llandaff, Exeter, and Worcester; fellow of Trinity College, Cambridge; incorporated M.A. of the Oxford University, 1578. He became tutor to the Pembroke family, where he made a friend of Sidney's sister. Through the patronage of this influential family he obtained many church preferments. In 1599, Queen Elizabeth was said to have called him to account for a sermon preached before her in which he made hints on behalf of the Earl of Essex, her quondam favourite. He wrote many little treatises which are very dear to the heart of collectors of Elizabethan quartos. They include his *Very Fruitful Exposition of the Commandments by way of Questions and Answers*, 1590 and 1600; and *Comfortable Notes upon the Bookes of Exodus and Leviticus*, 1604. A folio ed. of his works was ed. by Miles Smith, 1637.

Babington, William (1756–1833), physician and mineralogist, *b.* in Antrim, Ireland. In 1777 he was appointed assistant surgeon to Haslar Naval Hospital, afterwards obtaining

a position as apothecary at Guy's. His works include catalogues and systematic arrangements of minerals. His monument is in St. Paul's Cathedral.

Babinski's Sign, a medical term which indicates a curious physical phenomenon pointing to disease of the nervous system. If the sole of the foot of a person in normal health be tickled the toes bend inwards, but if there is organic disease of the lateral columns of the spinal cord the toes will bend upwards; the former is known as *flexor response*, the latter *extensor response*, or Babinski's sign.

Babirusa, **Babiroussa**, or **Babyroussa**, an interesting animal of the pig genus, and found only in the E. Indies, in Celebes and Buru. The B. is much more agile than the ordinary pig, having a less cumbrous body and longer and thinner legs. The peculiarity of this species lies in the fact



BABIRUSA

that the upper canine teeth of the male are persistent, like those of rodents, and pierce through the skin of the snout and curve back over the orehead. The teeth have even been nown to penetrate the skull. The eeth thus correspond to the tusks nd horns characteristic of the male ex of so many animals. This abormal condition of the teeth unoubtedly originated from adaptation a particular environment, though e exact reason of the phenomenon not apparent. The teeth probably ved as a means to facilitate the oture of the females.

aboon, or **Cynocephalus**, meaning g-headed,' a species of monkey. nerous branches of the family ude the mandrill, drill, sphinx, ema, and hamadryas. Africa was original home, though they have ad into the nearer portions of The most characteristic fea- of the animal are, prominent , large canine teeth, cheek nes, strange ugly cushions on they sit, and shortness of tail. s sacred in Egypt, and figures ntly upon Egyptian tablet inscriptions and statues. They usu live in herds and form danger opponents. They are intelligent a



BABOON

mals and possess well-developed brains, besides extraordinary ferocity of temper.

Babou, Hippolyte, a Fr. writer and critic, *b.* at Peyriac, Aude, in 1824. He wrote for the *Revue de Paris* under the signature 'Camille Lorrain,' and has contributed to numerous papers, such as *L'Illustration*, *La Revue Nouvelle*, *L'Athenæum Français*, and *La Revue Français*. He ed. *Lettres Familière écrites d'Italie à quelques Ans*, by Charles de Brosses, 1739–40, with preface and notes, and also *Les Mémoires de Madame de la Guelle*.

Babou, Jean, **Baron of Saggone**, a Fr. soldier, grand master of artillery, 1529. He commanded the artillery at the battle of Saint Denis, 1567, and took part in the battle of Jarnac in 1569, and died in the same year.

Babrius, a Gk. collector and versifier of fables. The period of his existence is probably before the age of Augustus, but so far efforts to discover more information concerning him have been fruitless. He collected many of Æsop's fables and turned them into choliambic verse. The first traces in so-called Æsopian fables of B.'s versification were discovered by Bentley. It was not until 1842 that a definite conclusion could be drawn, and then Minoides Minas, a Gk. in the service of the Fr. gov., while exploring the convents of the E., unearthed at Mt. Athos a manuscript containing no less than 123 then unknown fables of B. He made a copy of them, and in 1844 they were pub. Later, in 1857, he found ninety-five more, though their authenticity has been disproved

by eminent scholars, among whom are Conington and Cobet. The best ed. is Rutherford's, 1883.

Babu, or Baboo, originally an Indian term of address applied to a proper name and corresponding to the Eng. 'Mr.' The word has come to signify a native with a smattering of Eng. culture, and is used as a term of disrespect. B.-Eng. consist of polysyllabic words for the most part misapplied.

Babul Tree, the *Acacia Arabica*, also known as the gum-arabic tree, is a native of the E. Indies, Arabia, and Abyssinia. It is a tall tree and yields large quantities of gum-arabic, which is produced by wounding the bark and allowing the fluid to run out.

Babuyanes, a Malay word meaning 'pig islands.' They are a group of is. to the N. of Luzon, one of the Philippine Is. The most prominent isles are Babuyan, Calayan and Camiguen. They are of a mountainous character.

Baby, *see* BIRTH, CONCEALMENT OF; CHILD.

Babylon, anct. cap. of Babylonia, first mentioned in a tablet of 3800 B.C. From 2250 B.C. it became the cap. of Babylonia and the holy city of Western Asia. B. is the Gk. form of Babel, meaning 'The Gate of the God.' Under Nebuchadnezzar it became one of the wonders of the ancient world. Herodotus has a description of the city, and from the style of it one would imagine that he speaks as an eye-witness. It was in the form of a square with 120 stadia given as the length of one side. This would mean 15 m. The walls were furnished with 100 brazen gates, though the number according to Diodorus is 250. The two parts of the city were joined by a huge roofed bridge made of hewn stones fastened by iron clamps. Nothing as yet has been discovered of its remains. The earlier part of the city and that more truly Babylonian is the western. The famous temple of Baal, Birs Nimroud, is supposed to have stood in this portion of the city. An important pile of ruins in the western portion is probably the remains of a royal citadel. The ruins go by the name of Mujellibe. The hanging gardens of Semiramis, situated in the eastern division and counted as one of the wonders of the world, stand among the buildings of the Neo-Babylonian period. Diodorus has written a detailed description of them. It is evident wherever one goes in B. that great damage was done by Persian conquests. The outer walls were demolished during the revolt under Darius I. and the succeeding siege of two years' duration. For two months Alexander the Great employed 100,000 men to clear away the refuse that encumbered the streets, so sadly had the once magnificent town



THE RUINS OF BABYLON

fallen from its high estate. But he was unable even to finish his work of removing the débris. The difficulty in the way of conveyance of heavy stones from Armenia, the need for building material in the foundation of a new cap. on the Tigris, namely Seleucia, caused a hastening of the already rapid ruin of the city. Even in the early times of Pausanias little was standing save the walls. The Arabian authorities speak of a vil. Bâbil, but generally make mention more of the great masses of ruins. Naturally it has been a source of rich discovery by the antiquarian, and among the many explorers associated with this research the name of Rich stands out. The tn. of Hillah, with a pop. of 7000, is said by most authorities most accurately to represent the old city of Babylon.

Babylon, a fortress on the Nile in Lower Egypt. It became important first under Rom. occupation, though its origin has been stated to be Babylonian.

Babylonia (Assyrian *Babilu*, Persian *Babirush*), an alluvial plain watered by the Tigris and Euphrates. It now forms part of the independent Arabian State of Irak. References to it in the O.T. are made under the names Shinar, Babel, and 'the land of the Chaldees.' The varying fortunes of its successive rulers make the task of fixing its boundaries very difficult. Approximately the northern boundary from Naharaim (Mesopotamia) was formed by a line of fortifications estab. by mutual agreement between the Assyrian and Babylonian monarchs and separating their respective kingdoms. Allusions to 'the Median Wall' by classical writers probably refer to this boundary. The Tigris forms a natural eastern boundary, though portions of territory beyond it were at times included in the Chaldean empire. These dists. were Namri or Kurdistan. The desert beyond the Euphrates provided the western boundary, for a margin of fertile land on its further bank was a part of the Babylonian empire. The Persian Gulf formed the southern limit, for at that time its waters extended further inland. The fertility of the plain has made it at various times the most prolific corn producer in the whole of Western Asia. A network of canals onstructed throughout the country ted as a fine irrigation factor. Many these canals are navigable to-day. e chief is Nar Malka, which until the enth century A.D. was still in use. as now been abandoned as a result Mohammedan neglect. It joined Tigris and Euphrates in N. B., necting the cities of Sippara harvaim) and Akkad, then entering the Tigris 30 m. be dad.

Ancient records say that divided into sev. provs. whose and dimensions experienced variations in different periods empire's history. Primarily th important div. was the forming large provs., Sumir (Shinar, Sou *i.e.* the dist. stretching from Persian Gulf to Babylon, and Ak North B. The cap. of Akkad resem Babylon in being situated on banks of the Euphrates. The portion of the tn. was Sippar Samus (the Sun God) and the l part Akkad or Agade. It was called 'Sippara of the Moon Godd Hence the union of the two porti in the biblical name Sepharva which means 'the two Sippar Smaller provs. within these two m divs. were Gan-Duniyas (N. Akka Edina (or Eden or Zeru or Dura, t S. part of Akkad), Gambula, no Afadj, and Matkaldu, the land of th Chaldeans.

The exceptional fertility of th country resulted in the almost un bounded produce of corn and numerous other cereals, grapes and fruit of many varieties, semsame, sev. kinds of vegetables, cucumbers, melons, onions and garlic. The only building material available was clay, which existed in large quantities, while stone had to be conveyed from the mts. of Elam or Upper Mesopotamia.

The inhab. of B. have invariably consisted of many races, as far as can be ascertained from the classical writers. The oldest inscriptions show that the earliest known inhab. belonged to the Ugro-Finnic branch of the Turanian family, who were related ethnically to the Elamites of Susiana and the Turanian Proto-Medes, in whose tongue traces are found of a connection with the Ugro-Finnic branch. This race, the Sumero-Akkadians, were not originally natives of Chaldea, but, so say their traditions came from the mts. in the N.W., bringing with them some idea of the advanced civilisation which they presently estab. From various sculptures indications have been found of a Semitic element in the pop. during the very early portions of the history of the empire. Assisted by war and commercial intercourse, other races drifted into the plain, until we find the various peoples alluded to as the 'mixed crowd of nations.' Less advanced than the Sumero-Akkadians, the Semites quickly adopted their superior methods, and rising in numbers and power with equal celerity, they had so far estab. themselves in B. that we find in 2750 B.C.

a Semitic dynasty under Sargon of Agade ruling in N. Babylonia.

So many valuable tablets have been recovered from the anct. libraries that more information concerning the social life of B. is available than is the case with any other contemporary kingdom, with the exception of Egypt. A child directly after birth, if a male, was invested in the presence of witnesses with the titles and recognition due to sonship. At the end of eight or ten days circumcision took place, and on reaching puberty the young man was acknowledged a freeborn citizen. Marriage was regarded with a very strict eye. Every woman's dowry was secured to her and on divorce was returned, and the marriage ceremony was characterised by a reverence and solemnity excelling the present-day observance. An interesting fact, too, is the regard which women, especially married women, were held in the eyes of the citizens. An offence against a mother was rigorously punished, and the right to trade and own property in her own right was freely acknowledged. Education was compulsory to freemen, tablet writing forming one of the principal subjects. Admirable regulations existed for the welfare of the slave. He was protected from cruelty at the hands of his master, who, in the event of disablement following an injury, was compelled by law to support him.

Regularly chosen judges sat in the temple gates, sometimes in the great gate of the city, to administer the law. Those who were the prin. officials were called 'judges of the king.' Fines, forfeiture of civil status, and death were the punishments, while leave to appeal was granted. Taxes were based upon a fixed standard. The 'king's tax' was levied on all property. A revenue supported the army, to which all contributed, while those dists. most concerned paid a ship tax. Among local taxes were first-fruit tax, temple tithes (tenths), corn, date, and sheep taxes, and rates levied for the upkeep of canals and roads. The standard currency consisted of the silver coins, talent, maneh, shekel, and paras, which was first introduced in the time of Darius.

Discoveries on the site of the anct. city of Lagash yielded valuable examples of Babylonish art. Previously its only evidence was contained in a few gems and cylinders engraved with drawings. But added to these are statues of some acknowledged artistic merit. They bear a distinct value and style from other Babylonish art, and eclipse even that of later Assyria. Of these statues the most remarkable is one representing Gudea, the priest, the viceroy of the city. The statue is nearly life size, and is executed from the hardest diorite. On it is an inscription which testifies to his restoration of the temple in 2500 B.C. Even more valuable, both from an antique and artistic point of view, is a carved head in red porphyry. Its faithful delineation of the true characteristics that mark the Babylonish physiognomy is remarkable. An inevitable conclusion is that the art of B. represented by these statues was of an order and perfection attained only after hundreds of years of development, and scarcely less interesting is the fact that only perfectly made tools could have been used. The art of casting metals, too, is proved by the discovery of many bronze figures. At Tell el' Obeid have been found striking examples of another form of art—bitumen models plated with sheets of copper. Delicate work in gold and silver, in shell, alabaster and lapis lazuli have been found at Ur, in tombs dating from about 3500 B.C. The same high standard of execution marks the seal-engraving. Representations of the harp, pipe, and cymbals show that music was practised in the earliest times, while mention of the trades of weaver, dyer, potter, smith, and builder testifies equally to the fine level of achievements which the Babylonish peoples reached.

The history of B. has been traced back so far as 7000 B.C. by the discovery in 1888 of a temple at Nippur, and the antiquity of Babylonish civilisation is rivalled only by that of Egypt. A specimen of line writing (as contrasted to the wedge method) on a stone in the British Museum refers to the reigning monarch Sargon I., king of Agade, who lived about 2750 B.C. Proofs of the empire as a collection of independent cities are found in early records of the Sumero-Akkadian inhab., whose date is assigned to 4000 years B.C. Babylon was not always the anct. cap. References are found to the tn. of Uru-ki, or Erech, meaning 'the capital,' and around which a host of legends existed. Kish was capital for a time, and Ur, the city of the moon goddess, was the seat of three dynasties. From the latter city Abram came. Eridhu was the 'holy city' of S. Babylonia.

About 2300 B.C. occurred the union of the independent cities into one empire. This took place under Ur-Bahu or Ur-Engur, builder of the great ziggurat at Ur, his capital, During his reign he restored many temples, and in the cities under his sway appointed priest-viceroys. Dungi, his son, succeeded him, and many inscriptions have been unearthed, the work of his subjects. By this time the

standard of civilisation in Chaldea had assumed a high level. Among the studies, astronomy, mathematics, and science were prominent, while the Persian Gulf was freely navigated by Chaldean ships. At this time the Babylonians were at war with the Elams. In 2280 B.C. S. Chaldea was successfully invaded by Elam tribes under Kudur Nakhundi. Until 2120 B.C. this line possessed great power. Two out of the kings of this period are worth mention: Kudur-Mabug, king of the West (Syria), and Eri-aku, king of Larsa. Students of Assyria claim that this latter monarch is identical with Arioch, king of Ellasar, mentioned in Gen. xiv. Hammurabi (Khammuragas), overthrew Eri-aku. He was the sixth and most powerful ruler of the first Babylonian dynasty, and it is during this important period of Babylonian history that many political changes took place. At this time Babylon made her beginning in rising to the rank of the most powerful city in the empire. Many of the temples, specially those of Bel at Babylon, and of Nebo in Borsippa, had suffered demolition at the hands of the Elamite invaders. Hammurabi restored these, but a more important work was the construction of a canal associated with the Nar Malka, which crossed N. B. and Sippara. It is navigable to-day, and bears the name of Yusifieh. This line lasted little more than 150 years, of which number Hammurabi ruled 43. Babylon then fell into the hands of the Kassites, an Indo-European people, who founded a dynasty that lasted 600 years. It is chronicled more fully than any other period by contemporary historians, but few Babylonian tablets dealing with this time have been dscovered. Among them, however, is a very important one, that of a memorial stone of Nebuchadnezzar I., dated 1150 B.C. It is chronicled that he usurped the throne and warred against the Assyrians, who were rising to a powerful position. A detailed and descriptive account is given of a battle against the Elamites, at whose hands the Babylonians, but for help given by an adjacent city, would assuredly have been destroyed. As a reward, immunity from taxes and the usual duty of supplying soldiers was bestowed upon the helping city. From this time until the reign of Nabunazir (Nabonassar) the history of B. is to be found in Assyrian sources, and any clear or connected account is so far undiscovered. Nabonassar ruled fourteen years and ascended the throne 747 B.C. Two Assyrian invasions occurred, though the king, according to the Assyrian chroniclers to have been defeated, still maintained

his position. He was succeeded by his son in 734 B.C., but his reign lasted only two years, for in a revolt at that time popular, he was dethroned, giving place to Ukinziru. Tiglath-pileser III., King of Assyria, ... the Babylonian king was driven from the throne and killed in the marshy



BABYLONIAN KING

region of S. B. Tiglath ascended the throne under the title of Pulu of B. in 729 B.C. More than ordinary significance is attached to this conquest, as it brought more closely together than before the N. and S. portions of B. The Babylonians once more gained their independence during the usurpation of the Assyrian throne by Sargon the Tartan in 722 B.C. This regaining of Babylonian independen

was conducted under the leadership of *one of the most successful and popular* of Babylonian princes, Merodach-Baladan II. The attention of the Assyrians was occupied too fully by wars in Syria and other parts of their empire to allow them sufficiently to concentrate upon the powerful Merodach. An attempt was diverted by the action of Merodach in stirring up Hezekiah and other Syrian princes in revolt. But later, the inevitable attack came, and in 710 B.C. the Babylonian ruler was completely defeated by Sargon, who proclaimed himself king. In 705 B.C. Sargon was murdered, and Merodach restored. Only a few months, however, elapsed before he was again deposed, this time by Sennacherib. He fled to the [illegible] downfall the [illegible] by various princes and viceroys appointed by Assyrian rulers. Interruptions occurred here and there in the revolts which took place on behalf of, and directed by, native princes, but none were successful. Sennacherib, after a period of severe and strenuous fighting, defeated both the Elamites and Babylonians, who had allied themselves against him. He was succeeded by his son, Essar-Haddon, who, less martially inclined, attempted the more friendly policy of dividing his time equally between his two courts. His power, however, was considerably weakened by the ceaseless and determined opposition he met from Egypt in Syria, and incessant harassing by the Elamites and Babylonians. He was succeeded by his two sons, between whom he had divided the empire; but Assur-bani-pal, the elder, succumbing to the intrigues and temptations from the Babylonian courts, plotted the downfall of his brother, Samas-sum-yukin. A long and fierce war followed, in which Assur-bani-pal was defeated. The cities of Babylon, Borsippa, and Sippara were besieged, and Assur-bani-pal burned himself to death in his palace in 647 B.C. The dissolution of the Assyrian empire now took place, and the throne of B. was seized by Nabopolassar, a general of the garrison, whose wife was a princess of Media. In 625 B.C. a general invasion of Aryan and other eastern tribes gave B. a chance of ridding herself of the Assyrian yoke, and in the same year Nabopolassar was proclaimed King of B. His son, Nebuchadnezzar, succeeded him in 605 B.C. This monarch speedily made Babylon raise her head, and without doubt he can be said to be the greatest of all the sovereigns who ever ruled over the anct. empire. He reigned for forty-three years, and during that long time B., all her lost possessions once more regained, was able to take her place as the foremost nation and empire in the world. With few exceptions every building of any significance at all was rebuilt, and every mound in B., so far explored, has revealed bricks bearing his name. He captured Jerusalem in 599 B.C., and later, owing to its continued unrest, he destroyed the city and put into prison Jehoiakim. His son, Evil-Merodach, succeeded him, and promptly released Jerusalem's former ruler in 561 B.C. Evil-Merodach was murdered by his brother-in-law, Nergal-Sharezer, a '*chief seer*' of one of the temples. In 556 B.C. the throne was usurped by Nbu-naid, a powerful prince, whose reign ranks next to that of Nebuchadnezzar in importance. In almost every temple, the inscriptions speak of Nbu-naid, and record important historical information. We learn from a cylinder discovered at Sippara that he rebuilt the temple at Karran, which had suffered destruction from the Scythians, and further, it records that Cyrus defeated Astyages, King of the Medes, in 550 B.C. Cyrus took Ecbatana from him in the same year. He left Babylon and went to Tema, the modern Teima, in Arabia; in his absence Belshazzar was appointed by him as governor. Finally Cyrus attacked and took Babylon 539 B.C.; apparently some Babylonian sympathies were on the Persian side against Nabonidus. The kingdom now suffered invasion at the hands of Cyrus, who advanced as far as Sippara, where the garrison surrendered to him. Babylon was taken with almost equal ease, and Cyrus appointed Gobryas as ruler. In 538 B.C. B. became a Persian prov., and a period of peace under Cyrus and Cambyses appears to have followed. But the dominant spirit of revolt rose again on the accession of Darius, son of Hystaspes, and for three years the rebellion lasted. But it was put down finally by Nadluta-Bel, who claimed to be Nebuchadnezzar II. However, the irrepressible Babylon again rebelled in 513 B.C., under Arakha, a native of Armenia. Presently the Persian rule was destroyed, and for a short time Alexander the Great ruled over the city. He gave orders that the great temple of Bel (The Tower of Babel) at Babylon be restored, and archaeologists have found proof that the site was actually cleared. The actual rebuilding did not take place, for, in 323 B.C. Alexander died. Meanwhile a conference had been held at Triparadisus, and Seleucus had been promised the succession. Antigonus contested his claim, but it was finally won

Seleucus I. in 312 B.C. It was taken from the Syrians in 140 B.C. by the Parthians. For a brief period the empire came under Roman rule, under Trajan in A.D. 114, Septemus Severus in A.D. 199, and again in A.D. 363 under Julian. In 650, under Mohammed's successors, the prov. of B. became a seat of the Califs, and the tn. of Bagdad was built in it (762–6). This lasted till 1258. Four centuries later the Turks, for the second time, wrested it from the Persians, and since that time it has been divided into Bagdad and Basra, under the dominion of Turkey. Both provinces were occupied by the British in the Great War, Basra in 1914, Bagdad in 1917. By the Treaty of Sèvres 1920, the land of Iraq (Mesopotamia) became an independent state under British mandate, and in 1921, the Arab state of Iraq came into being, the Emir Feisul (*q.v.*) son of the King of Hejaz, being crowned king.

The excellence of the administration and the high level of civilisation which have been mentioned elsewhere, and the commerce, carried on by means of caravans, with Bactria, Persia, and Media, and by shipping with Arabia, speak for the general prosperity that the kingdom enjoyed. The true Babylonians, or the Sumero-Akkadians, possessed literary inclinations in a most marked degree. The large number of inscriptions executed by private persons, and the numbers of people of highest rank who also belonged to the 'writing class,' form sufficient evidence to testify more than ordinarily to the excellence of their attainments. Upon inscriptions on some of the tablets have been discovered directions to intending students as to the method of get-
ing a 'book' from the library, while
he arrangement of the works was in
horough order, and maintained with
crupulous care. Naturally the litera-
re of B. was affected by native
hools of thought. This meant that
e various depts. of literature re-
cted to some degree the teachings of
various temples. Of the specimens
Babylonian literature one of the
st perfect is a tablet containing a
ription of a war in heaven between
god Merodach, or Marduk, and
evil spirit Tiamot. This valuable
et was discovered in the library
e temple of Nebo, in the town of
ippa. There is a Babylonian
on, as well as one in Assyrian.
ibed in language exceptionally
iful is the story of Merodach's
given by the gods, of battling
t all the forces of evil. Con-
g the last victory of Merodach is
n of praise of extraordinarily
language and expression.

Every subject known at the ti
represented in the various libra
History, mythology, theology, as
nomy, astrology, magic, arts of div
tion, geography, myths, fables, poe
and proverbs, all are included.
the proverbs is a very curious one
lating to Zu, the god of the birds.
are told how he stole the secrets of t
gods and the tablets of destiny, a
brought them to earth. For this s
he was driven to the mts., where
was confined. A noteworthy distin
tion existing between Assyrian an
Babylonian literature is the curiou
fact that in Assyrian all credit is taken by the king for its literature, while in Babylonian the names of the various authors are borne on the tablets.

The varying occupations and successes of the Babylonian races necessarily point to equally changing religions. The earliest known indications of worship belong to the Sumero-Akkadian people, who practised a kind of fetishism or Shamanism. This acknowledged the existence of an inner spirit within every object in nature. This doctrine created a body of medicine men, whose powers were only sought and used against those forces of nature which were regarded as hostile to man, *e.g.* sicknesses, etc. Many of the hymns of these 'priests' have been discovered in the libraries of Nineveh and Babylon. As their knowledge grew, so did their army of gods, and hence we find the gradual formation of a hierarchy of gods called the spirits of heaven and earth. This gave place in time to a conception of the spirit of heaven and the spirit of earth as creators, or Dingri. From these arose a number of lesser gods, each city differing from the other in its choice of that which was held most sacred. Gridhu seems to have been one of the oldest seats of religion. Her
Ea, the god of the sea, was supreme. He is embodied in a symbol half fish-like, and Berosus says he taught the first elements of learning to the Chaldean people. His female companion was Dav-Kina, the 'lady of the earth.' Thus it will be seen that the Chaldeans regarded water and earth as the two fundamental elements of matter, and also the only two materials from which the earth was made. The son of this pair was Tammuz, who was
replaced by Merodach. Tammuz ha
a wife named Istar, and the worshi
of this couple reached over a larg
portion of the Babylonian empir
The next god, according to rank, w
Mul-lil, or Enlil, whose sacred
was at Nippur. This god it was
caused the destruction of wicked
His wife was the 'lady of the
land,' or Hades. She was

who ruled over the land from which there was no return. They had a child named Naptar, 'the demon of fever.' His work was the spreading of disease. The moon-god was another descendant of Mul-lil, and presently he rose to be greater than his father. He was estab. most firmly in the city of Ur, and soon became an influence upon the countries of Kharran, Syria, and Arabia. There is much sacred poetry in Chaldean, but none is so beautiful as the hymns to the moon-god. In Sippara and Akkad particularly, and more or less throughout the whole empire, the Semites influenced the religion so much that their god, the sun-god, soon became pre-eminent. Its highest development existed at Sippara, and a tablet in the British Museum has portrayed upon it a representation of the sun-god with priests and kings in the act of worshipping the sacred sun-disc. This god later became the Baal that absorbed the entire army of lesser deities. In the religious history of the later empire Merodach assumes a high place and abstention from his worship was punished. His temple was one of the architectural wonders of the world. Next in importance was Nebo, with his consort Tasmit. They were worshipped at the Eridu temple, the largest seat of learning of Chaldea.

Recent Discoveries.—Scientific excavations are continually being made on the sites of B.'s ancient cities, and at three of the oldest towns, Kish, Ur and Eridu great discoveries have been made. The Sumerian King-lists state that after the Flood there were dynasties first at Kish, then at Erech and thirdly at Ur. The first two are probably mainly legendary, for the kings are said to have ruled from 100 to 1200 years each, but confirmation has been found of the early dynasty at Ur, from a tablet unearthed from the site of Tell el 'Obeid, which states that the temple there was built by A-an-ni-pad-da of Ur, who was the second ruler of Ur's first dynasty, c. 3300 B.C. Excavations at Ur itself have revealed direct evidence of the Flood in a bed of water-laid clay, 8 ft. thick, below which are found the painted pots and flint implements of a non-Sumerian race bearing no affinity to the civilised metal-using people whose remains are found above. Some distance above the flood-clay, a tomb has been discovered, containing four-wheeled chariots (the earliest known), the remains of sacrificed slaves, and much delicate metal-work. This tomb dates from about 3500 B.C., and demonstrates the advanced state of B.'s civilisation even at that early date, and also the extent to which she traded, for neither metal nor wood was o be found within her borders. Of Ur's second dynasty little has been found; the third was that founded by Ur-Engur about 2300 B.C. The excavations of Ur were undertaken by the British Museum in 1918, and by the British Museum and the University of Pennsylvania from 1922 onwards. Work was done under the direction of Mr. C. L. Woolley, to whom, and to the late Dr. H. R. Hall, is due also the discovery at Tell el 'Obeid, 4 m. away, of the oldest building known. In 1918 the site of Eridu was excavated by Mr. R. Campbell-Thompson. Very old inscriptions were discovered, and it was found that Eridu, now far from the coast, must in her days of power, have been a seaport, and in all probability an importer of building stone. Kish was excavated, 1922–24, by Mr. Ernest Mackay for the Herbert Weld and Field Museum Expedition, which worked on behalf of Oxford Univ. and Chicago. Here also evidences of the Flood were found. At Babylon itself a German expedition has been unable, owing to the presence of water, to explore the deeper strata, but has revealed enough to give a clear impression of the construction of Nebuchadnezzar's palace there. The great Ishtar Gate, as excavated 40 ft. high, is especially remarkable. Like the rest of the city it is constructed entirely of brick; it is adorned with nine rows of dragons and bulls in relief; and used to be covered, in Nebuchadnezzar's time, with a glaze of brightly coloured enamel. Babylon's ziggurat, the true Tower of Babel, has also been investigated. There is still much work for the archæologist in B., for none of the cities has as yet been completely excavated, and many have been barely begun. Nor is it in B. alone that discoveries may be found to throw light on her history, for the famous Code of Hammurabi and the stele of Naram Sin, were found, spoils of conquest probably, in Susiana.

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Babyroussa, *see* Babirusa.

Baca, Valley of (Heb., valley of balsam trees), is a place mentioned in the O.T. (Psalm lxxxiv. 6), and is probably El-Bakei'a, which lies between Jerusalem and Bethlehem.

Bacacay, a tn. of Luzon, Philippine Islands, on the Gulf of Tabaco. It is in a fertile dist., but is frequently disturbed by the volcano Mayon. Pop. 20,211.

Bacarra, a tn. of Luzon in the Philippine Islands, 4 m. N.E. of Loag. It is situated in a fertile dist. in the prov. of Ilocos Norte. Pop. 14,500.

Bacca, the technical name for the fruit commonly called by the name of berry. It is used to designate those fruits which have a thin skin, are pulpy internally, and have sev. seeds lying loose in the pulpy mass, *e.g.* the gooseberry, currant, and vine.

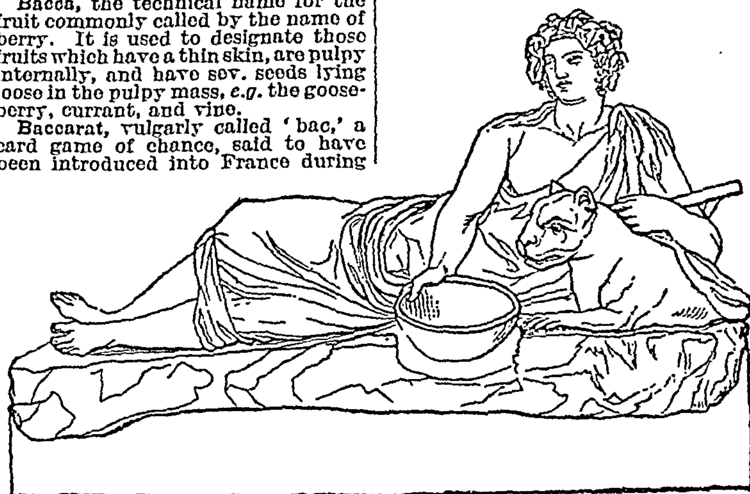
Baccarat, vulgarly called 'bac,' a card game of chance, said to have been introduced into France during the reign of Charles VIII., since when it has had widespread popularity. There are two types of the game—*baccarat à banque* (or *baccarat à deux tableaux*) and *baccarat chemin de fer* (*q.v.*) The rules of the game are intricate. In this country B. played for stakes is illegal, being a card-game not involving skill, but on the Continent it is one of the most vicious and persistent gambling games.

Baccarat is a tn. situated in the dep. of Meurthe-et-Moselle, France, 15 m. S.E. of Luneville. It has most extensive crystal works. Pop. 5739.

Baccha, a genus of dipterous insects of the family of Syrphidæ. It is remarkable in that the species have the two basal joints of the abdomen very long and slender, but the remaining joints depressed and suddenly increased in breadth. It is generally of a black or bronze colour, with yellow spots or markings, and is found in Britain.

Bacchæ, the women who took part in the wild orgies of the Bacchanalia, a festival of Bacchus, the Rom. god of wine. They were variously known as B., Bacchantes, and Mænades.

Bacchanalia (from Bacchus, Gk. βάκχος, the god of wine) were feasts in honour of Bacchus. Men and women, intoxicated with wine, clothed in deer-skins and Asiatic robes and carrying *thyrsi* (*i.e.* staves wrapped round with ivy and vine leaves) in their hands, ran about beating drums and cymbals, and crying to Bacchus. They were first introduced at Rome 187 B.C. (Livy, xxxix. 8–9). These feasts were celebrated every third year, and were hence called 'Trieterica.'



BACCHUS

Bacchante, a priestess or female votary of Bacchus. The representation of Bs. was popular among classical sculptors.

Bacchiglione, a riv. in Venetia, northern Italy. It rises in the Alps, and after passing Vicenza and Padua, flows into the Adriatic Sea opposite Chioggia. Its total length is 90 m., and it is navigable to Vicenza.

Bacchius, a Gk. writer, sometimes incorrectly called Vacceus. He was the author of 'An Introduction to the Art of Music,' in questions and answers, a work contained in the collection of Meibomius. It is not certain when he lived.

Bacchus, a name used by the Gk.

and Rom. writers for Dionysus, the god of wine. Traces of its use in Gk. are found in the period succeeding Herodotus. It commenced more particularly as an ordinary surname, later developing into a term of opprobrium. Though it finally was adopted to signify the wine god, it only applied so far as the Gks. used it, to the spirit that pervaded an abuse of wine, being therefore more truly the god of the carouse. Here and there its name Dionysus is used in Latin, though the Augustan poets used the alternative invariably. The introduction of the worship of this god came originally from Greece, and thence proceeded to Rome. Here a union was formed between the Italian deity Liber, a god of some antiquity then, who was the spirit pervading and controlling the destinies of planting and the cultivation of fruit. On every 17th day of March the Liberalia festival was held, at which youths were invested with the toga virilis, thereby proclaiming their manhood; but this feast is quite separate from that of the triennial Bacchanalia (Dionysia). This latter was nothing more than a disguise assumed for bouts of obscenity. It was, at length, abolished in 168 B.C., by order of the senate. *See* Louis Dyer, *The Gods of Greece*, chs. iii. and iv.; Prof. L. Campbell, *Religion in Greek Literature;* Sandy's *Introduction to the Bacchæ of Euripides*.

Bacchylides, a Gk. lyric poet, a native of the is. of Ceos. His period is said by Eusebius to be about 500 B.C. The earliest of his odes is dated roughly at 479 B.C. He visited the court of Hiero I. of Syracuse (478–467). There are evidences that Hiero showed a preference for B.'s odes to those of Pindar, and a rivalry is supposed to have developed between the two poets, which, however, did not result in any show of bitter feeling on the part of B. A characteristic trait of his writings is clear simplicity, yet with a love of detail, especially that of a picturesque nature. B.'s poems are of two kinds, odes to victory and dithyrambs, or passionate hymns. Among recent discoveries in ancient literature must be included his *Odes*, which were found inscribed on an Egyptian papyrus, ed. by Kenyon, 1897. Best edition, Jebb's, 1905.

Bacciarelli, Marcello (1731–1818), an historical painter. He was *b.* at Rome, and studied under Benefiali. At the age of twenty-two he was summoned to Dresden, and there worked for Augustus III.; on the death of his patron he lived in Vienna and Warsaw. He remained in Poland for the rest of his life, and became director of the fine arts during the reign of Stanislas Auguste Poniatowski. He chose his subjects largely from Polish history, and executed a remarkable series of portraits of the Polish kings, from Boleslaus Chrobry to Stanislas II. He died at Warsaw.

Bacciocchi, Felice Pasquale (1762–1841), *b.* at Ajaccio, Corsica. He was a captain of the infantry, and married Elisa Bonaparte, the sister of Napoleon I. He became a senator in 1804, and was made a general and Prince of Lucca and Piombino in 1805. He died at Bologna.

Bacciocchi, Marie Ann Elisa (1777–1820), the eldest of Napoleon Bonaparte's sisters, *b.* at Ajaccio in Corsica. Married (1797) Capt. B. (*q.v.*) of the Royal Corsican Regiment. On Napoleon's assumption of the imperial crown, she became Princess of Pionambo and soon after of Lucca. In 1809 she became, by decree, Grand Duchess of Tuscany. On the downfall of her brother she went to Bologna, where she passed under the name of Countess of Campaniano.

Baccio, della Porta, *see* BARTOLOMMEO FRA.

Bach, Alexander Anton Stephan, Baron von (1813–93), an Austrian statesman, *b.* at Loosdorf, Lower Austria. At twenty-four he became a doctor of laws, and entered the imperial service. He disapproved of the absolute system of Metternich, but was not prepared to go as far as the revolutionists in 1848. Became a Minister of Justice, 1848, and a Minister of the Interior in the following year. He was a strong conservatist; took part in the emancipation of the peasants from feudal obligations; an opponent of the Slavs and Hungarians; ambas. at Rome, 1859–67. *See* Springer, *Geschichte Oesterreichs seit dem Wiener Frieden*, Leipzig, 1863–5.

Bach, Johann Christian (1735–82), eleventh and youngest son of Johann Sebastian, was *b.* at Leipzig. After his father's death he studied under his brother Emanuel at Berlin. He became a pupil of Padre Martini in Italy in 1754, and in 1762 he [illegible] appointed organist at Milan Cath[illegible] for which he composed some [illegible] In 1762 he accepted an invit[illegible] England. His success was ra[illegible] his operas and concerts [illegible] thusiastically received. He [illegible] came music master to the [illegible] his operas *Orione*, 1763 [illegible] *Ele[illegible] di Scipione* wa[illegible] but his work was not [illegible] endure, and to-day his [illegible] are all but forgotten.

Bach, Johann Ch[illegible] [illegible] 1703), a musician, son [illegible] of Arnstadt. He was [illegible] at Eisenach from 16[illegible] he was a great mas[illegible]

position, but none of his works were pub. Many of his manuscripts are in the Royal Library at Berlin.

Bach, Johann Sebastian (1685–1750), in the front rank of the great musicians of the world. He was *b.* at Eisenach. He came of a family of noted musical talent. Two of his father's cousins, Johann Christophe B., and Johann Michael B. are worthy of mention, as their influence upon their relative was in some degree responsible for the great result. At the early age of ten Sebastian's father, Ambrosius, died. The boy was cared for by his brother Christophe, an organist at Ohrdruf. The extraordinary talent shown by Sebastian excited his brother's fears, and a manuscript of organ compositions by great masters was sedulously hidden from the prodigy. However, Sebastian obtained access to the book, and copied its contents by moonlight in order to escape detection. The disagreeable result was its confiscation immediately following its discovery. The work had taken the boy six months to accomplish. His beautiful soprano voice led him to a place in the choir at St. Michael's school at Lüneburg, where he practised as an accompanist on the harpsichord and as a violinist at the breaking of his voice. This was in 1700, and three years later he obtained a royal appointment at the court of Weimar, where he became acquainted with much It. music. In the succeeding year he became organist at the new church of Arnstadt, and here he began to compose. His brother's alliance with the Swedish Guard led to the composition of the wonderful *Capriccio on the Departure of a Brother*, which famous work was followed and also preceded by many of his 'church cantatas.' At this time B. obtained permission to go to Lübeck in order to hear the great Danish organist, Buxtehude, then seventy years old. His enthusiasm led him to exceed his ...e of leave, and this, with other ...sons, led to a fresh appointment at ...alhausen. He only stayed here a ..., during which he married a ...in, Maria Barbara B., securing a ...ion as court organist at Weimar. ... he spent nine years, and com... the best of his cantatas, while a study of It. masters gave him a ...ugh mastery of their style, the ...ations being thus formed for the instrumental work he produced. ...e journey from Weimar in 1717 ... sprang up between the sup...s of B. and a Fr. harpsichord... Marchand. The two men ...ed became involved, and a ...ge was exchanged. On the ...ed for the trial the Fr. musician was nowhere to be found, hi[s] better feelings and genuine acknowledgment of B.'s superiority being the causes of his flight. In 1720 his wife died, and in the following year he married Anna Magdalena Wülkens, who assisted his compositions by the possession of musical ability, and many of his manuscripts are in her hand. From this time B. commenced the composition of his famous 'suites,' while the first half of the celebrated *Forty-eight Preludes and Fugues* was also written, though many years separated the first from the complement portion. In 1722, after some difficulty, B. was appointed to the vacant position of cantor of the Thomas-schule at Leipzig. Here all his finest choral work was written, in which is contained the two settings of the story of the Passion, and the Mass in B minor. In 1736 he presented two movements from the latter composition to Augustus III., and received the honour of Hofcomponist. In 1747 he visited Frederick the Great at Potsdam. The king suggested a theme upon which B. immediately improvised. A few years later his eyes became painfully troublesome, and total blindness resulted from an operation. Apoplexy caused his death, aggravated by the remedies used during the unhappy operation. Besides his musical compositions, B. made many inventions, among which the most lasting are the modern fingering scheme and the arrangement of the piano which makes it possible to be played in all keys.

Bach, Karl Philip Emanuel (1714–88), the third son of Johann Sebastian, was born at Weimar. In his youth, though he studied under his father he intended to adopt the legal profession. In 1738 he graduated, but soon abandoned the idea of a legal calling and determined to devote his life to music. In 1738 he went to Berlin, where he became private pianist to the king. His favourite instrument was the clavier, for which he composed about 200 pieces, while his *Versuch über die wahre Art das Clavier zu Spielen* was recognised as an epoch-making book in the history of music. In 1768 he went as musical director to Hamburg. At Hamburg he composed his famous oratoria, *The Israelites in the Wilderness*, and his *Sonaten für Kenner und Liebhaber*, which is his greatest work. He died at Hamburg. The works of Karl Philip have suffered an undeserved eclipse in recent years.

Bach, Wilhelm Friedemann (1710–84), the eldest son of Johann Sebastian, was naturally the most talented in the family, but his career was

ruined by idleness and vicious habits. In 1747 he was appointed musical director of the Liebranen kirche at Halle, but lost this position owing to his dissolute habits. He lived a vagabond life thenceforward, and died in extreme want at Berlin. Some of his fugues, polonaises, and occasional pieces are extremely fine.

Bacharach, a tn. of Prussia in the prov. of Rhineland, beautifully situated on the l. b. of the Rhine. There are some very interesting mediæval remains including a Gothic church of the thirteenth century. The tn. has always been an important centre in the wine trade. Pop. 1810.

Bachaumont, Louis Petit de (1690–1771), a Fr. man of letters, and a prominent member of the set which frequented Mme. Doublet's salon for forty years. His minor publications are: *Essai sur la Peinture, la Sculpture, et l'Architecture*, 1751; *Mémoires sur le Louvre*, 1750; but he is chiefly remembered for *Mémoires secrets pour servir à l'Histoire de la République des Lettres*, which was pub. in Paris, 1771, in six vols., and was afterwards extended to thirty-six vols. by Pidansat de Mairobert and Mouffle d'Angerville. Consult Goncourt, *Portraits intimes du XVIII^e Siècle*.

Bache, Alexander Dallas (1806–67), an American physicist, *b.* at Philadelphia, a grandson of Benjamin Franklin. In 1821 he entered West Point Military Academy. Professor of natural philosophy and chemistry in the university of Pennsylvania, 1828; president of Girard College, 1836; and superintendent of the coast survey, 1843. His scientific work dealt in particular with meteorological and magnetic phenomena, in which connection he wrote *Observations at the Magnetic and Meteorological Observatory of Girard College*. *See* a memoir by Henry, reprinted in *Smithsonian Report for* 1870.

Bache, Franklin (1792–1864), an American physician and chemist, was *b.* at Philadelphia, Pa. He graduated at the university of Pennsylvania in 1810, and took his medical degree there in 1814. He was professor of chemistry in the Franklin Institute, 1826–32; in the Philadelphia College of Pharmacy, 1831–41; and in the Jefferson Medical College, 1841–64. He was president of the American Philosophical Society, 1854–5. With Dr. G. Wood he prepared a pharmacopœia (1830) which has been taken as the basis of the *United States Pharmacopœia* and *United States Dispensatory*. He also pub. *System of Chemistry*, 1819; *Introductory Lectures on Chemistry*, 1841–52, and other works on similar subjects.

Bachelet, Jean Louis Théodore (1820–79), a Fr. scholar, was *b.* at Pissy-Pôville (Seine-Inférieure), and *d.* at Rouen. He was educated at the lycée at Versailles, and entered the normal school in 1840. He became a professor of history six years later, and lectured in the provs. at Rouen and at Paris. He wrote many historical works, the chief of which are, *Dictionnaire général de Biographie et d'Histoire*, 1875, and *Dictionnaire général des Lettres, des Beaux-Arts, des Sciences morales et Politiques*, 1862, in which Charles Dezobry collaborated.

Bachelier, Jean Jacques (1724–1806), a Fr. painter, *b.* in Paris. He was a director of the porcelain factory at Sèvres and also of the Academy of Painting, Sculpture, and Naval Architecture at Marseilles. In 1765 he founded an industrial school of art at Paris. He was received into the Fr. Academy as a flower painter in 1751 and as an historical painter in 1763, and exhibited at the Salon regularly between 1751 and 1767. His best known works are 'The Death of Abel' and 'Cimon in Prison.' He is the author of *L'Histoire et le Secret de la Peinture à la Cire*, 1755.

Bachelin, Auguste (1830–90), a historical, genre, and landscape painter, *b.* at Neuchâtel and *d.* at Berne. He was a pupil of Moritz at Neuchâtel, and then went to Paris (1850), where he studied under Gleyre and Conture. He exhibited at the Paris Salon from 1857 to 1874, at first confining himself to genre and landscape. In 1859 he accompanied Garibaldi's volunteers, after which he painted many military and historical scenes. The following are among his best works: 'March of a Swiss Battalion,' 1860; 'Bourbaki's Army entering Swiss Territory'; 'Death of Ensign Montmollin,' 1866; 'Haymakers of the Alps,' 1863; 'Wrestlers of Hasli,' 1867.

Bacheller, Irving, American author, *b.* at Pierpont, New York, *1859*; some time editor of *New York World*. Author of *The Master of Silence* (1890); *Eben Holden* (1900); *D'ri and I* (1901); *Darrel of the Blessed Isles* (1903); *Vergilius* (1904); *The Master* (1910); *Keeping it up with Lizzie* (1911).

Bachelor, a word of uncertain etymology, probably derived, through the Fr., from Low Lat. *baccalarius*, a word used in the eighth century of a servant, male or female, who assisted on a farm; cf. *baca*, Low Lat. for *vacca*, a cow. (1) The word bachelor was early applied to a young knight or novice in arms who had no following of his own but fought under the banner of another. (2) It was also used of monks in the early stages of their

order who performed menial duties. (3) It was adopted in university life. *See* BACHELOR OF ARTS. (4) In the popular sense of the word, it is used of an unmarried man, or candidate for matrimony. In Rome legislation placed unmarried men (*cœlibes*) under certain disabilities, the chief of which were contained in the Lex Julia et Papia Poppæa in A.D. 9. The object of such legislation was to encourage citizens to bring up children for the state. Penalties on bachelors were also inflicted in Sparta and at Athens. In England, too, higher taxes have, from time to time, been imposed upon bachelors, but chiefly with a view to raising money for some additional state expenditure. In 1695 an Act was passed by which bachelors and childless widowers had to pay a yearly tax of one shilling up to £12 10s. according to rank. In 1785 a higher tax was imposed for the servants of bachelors, and in recent years deductions in income-tax have been allowed to married persons with children. *See* CELIBACY.

Bachelor of Arts, for derivation, *see* BACHELOR. The word was first adopted into university life in the thirteenth century. Pope Gregory IX. introduced the word *baccalarius* to indicate one who had undergone the first academical examination, but was not yet a 'master' or 'doctor.' The word was altered by a pun to *baccalaureus*, as if it were connected with *bacca lauri*, laurel berry. *See* DEGREES.

Bachman, John (1790–1874), an American naturalist, pastor of the Lutheran church in Charleston, S.C., 1815–74. Collaborated with J. J. Audubon in *Quadrupeds of North America*, 1846–54. Of his other works mention may be made of, *A Defence of Luther and the Reformation*, 1853; *Characteristics of Species and Genera as applicable to the Doctrine of the Unity of the Human Race*, 1854.

Bachmann, Charles Louis (1716–1800), a Berlin violin-maker and distinguished musician. His violins and viols are much sought after; he invented the screw-pin. In 1770 he founded with Benda the concert of Berlin amateur-players which lasted for thirty years.

Baciccio, Jean-Baptiste Gauli (1639–1709), an It. painter. He was *b.* at Genoa, where he received instruction in design and colouring. Later he was a pupil of Bernini at Rome, where he painted portraits of the seven popes and the cardinals of his time. He is also famous for historical compositions, and he painted frescoes and ceilings in churches. His best known works are those in the angles of the dome of St. Agnes in the Palazzo Navona; the 'Assumption of St. Francis Xavier' in the vault of the Church del Gesù; the picture of St. Anne kneeling before the Virgin and child; and the altar-piece of the 'Death of St. Savero' in the Church of St. Andrea.

Bacillus (diminutive of Lat. *baculus*, a rod), a genus of schizomycetæ, but popularly confused with bacteria. The bacillus has like bacterium a rod-like formation, but is distinct as being larger, non-motile, and has a different method of reproduction. The Danish scientist Müller first named this type about 184[illegible]. T[illegible] phthisis a [illegible] Dr. Yeo [illegible] from a quarter to half a blood corpuscle in length.

Back, *see* SPINE.

Back, Sir George (1796–1878), a British arctic explorer, was *b.* at Stockport. In 1808 he entered the navy, but was made captive by the Fr. in Spain. He was associated with Franklin in three Polar expeditions in N. America. In 1833 he commanded in the expedition organised in search of Sir John Ross. During the expedition he suffered great hardships, but discovered Artillery Lake and the Great Fish R. On his return he was made captain. In 1836 and 1837 he continued his arctic expeditions. In recognition of his valuable discoveries the Geographical Society awarded both its medals to him. In 1839 he was knighted, and in 1857 he was made admiral. During the years of his retirement he suffered from ill-health. His works are a *Narrative of an Expedition in H.M.S. Terror*, 1838; and a *Narrative of the Arctic Land Expedition*, 1836.

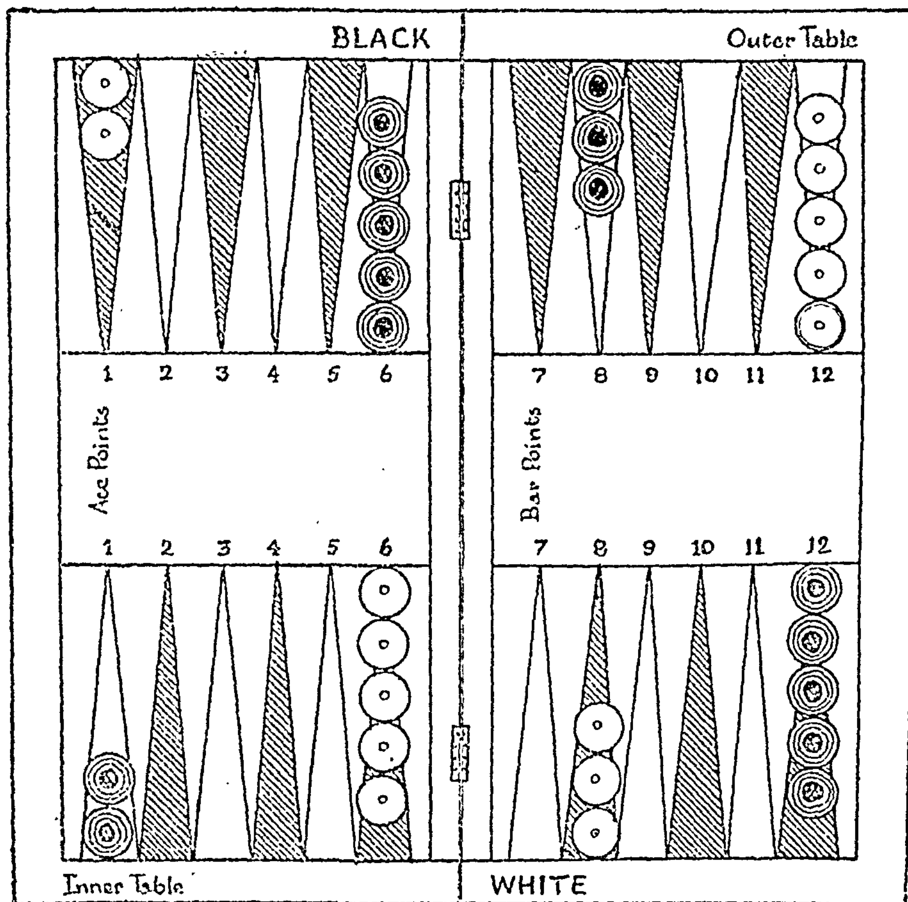
Backbond, a term used in Scottish law for a document which shows that the holder of a title receives it only in trust, and is accountable for its use to its real owner.

Backer, Adrien (1636–86), a Dutch painter, nephew of Jakob B. (*q.v.*). He was *b.* in Amsterdam, and in early youth studied in Italy. He chiefly executed portraits and historical pieces. There is a fine picture of the Judgment of Solomon in the town-hall of his native city.

Backer (or **Bakker**), **Jakob de** (1609–51), a Dutch painter, *b.* at Harlingen; studied under Lambert Jakobz at Leewarden and afterwards under Rembrandt at Amsterdam. He is chiefly known for his portraits, which he executed with remarkable facility and speed. He also painted historical subjects. There is an excellent head of Brouwer by this artist in the collection of the elector palatine, and a picture of the 'Last Judgment' is in the cathedral church at Antwerp.

Backergunge, *see* BAKARGANJ.

Backgammon, a very old game in England which until the seventeenth century was called 'the tables.' The obvious derivation of the word is 'back game,' as it is necessary in order to win, to bring one's 'men' back from the opponent's tables into their own, and also from the penalty attached to the pieces of going back to its starting point. A similar game, 'the twelve line game,' was in vogue among the Romans, which consisted of a board, pieces, and the throwing of a dice which controlled the movements of the respective pieces. The game is played in France, where it is called tric-trac, from its noise occasioned by the throwing of the dice. The game is one more of chance than of skill on account of the large part played by the dice-throwing. The board or table consists of two parts or 'tables.' At each end of the table are six points, alternately coloured white and black. Two persons take part in the game, owning each fifteen pieces. The two sets of fifteen are one black and the other white. At the commencement of the game the pieces are placed at particular places on the table (see illustration). Two dice are used, and each person has his own dice box, though the dice themselves are used by both parties. The throws are alternate. In the event of a 'doublet,' *i.e.* the throwing that results in two similar numbers, the number signified by the dots may be doubled. Those numbers indicated accidentally by the dice when thrown bear a certain relation to the points of the table, and it is necessary to observe the position of the men on the points in order to understand the connection and the regulations that control movements. The persons sit at the tables so that the points of their opponents face them. Suppose one player be called Black and the other White. The



BACKGAMMON

question of 'starter' is decided by a throw of the dice, the higher score being the determining factor. The men are moved from point to point. The direction of White's moving is from Black's right hand table to Black's left hand table, then to White's outer table, and thence to White's inner table, completing the journey. Black's path is, of course, *vice versâ*. The number signified by the dice, when thrown, indicates the number of points the thrower is allowed to travel unless the point at the end of the number is blocked by having two or more of his adversary's men upon it. The number indicated by the dice may be taken wholly with one man or shared between two, so that each takes the number separately indicated. It is compulsory for a player to move the whole number signified if able. A 'point' is made by a player on placing two of his men on the same point. A 'blot' is that point occupied by one man; and it is cancelled by the arrival of an opponent who thus compels the previous occupant to go back to the bar. The numbers of the points count from the ace-point as 1, 2, 3, 4, 5, 6, and the 'man' sent back to the bar is only allowed out again when the throw of the dice corresponds to the number of an unblocked point. While he has a man to enter, a player may not move any other man. When all his men are in his inner table, or 'home,'
he game is continued by that player
or the purpose of removing his men
rom the board by throwing a number
at corresponds with the point he
shes to empty. He may make a
ove with any number instead of
ring a man away. When six is
pty, the same number being
wn is able to empty the other
ts, though, of course, singly. It
ssible that a player be hit on a
while bearing his men off the
l. In this case he must enter on
ponent's inner table and must
the man into his own inner
efore he may continue taking
n off. The winner is he that
s first in removing all his men
e table. The degrees of win-
as follows: 1. A 'single' win
ponent has begun bearing.
lled a 'hit.') 2. A 'double'
e adversary has not borne a
his is a 'gammon.') 3. A
in if the opponent has a
e opponent's inner table.
t of a series of games being
beginner of the next is
by the degree of victory.
s won the victor begins;
n,' a single die must be
e winner of two games
he 'rub,' of two games

There is a Russian game
Russian B., which is in bulk si
to the Eng. game, as it vari
only a very few rules from
latter.

Backhaus, Wilhelm (*b.* 18
eminent Ger. pianist, *b.* in Leip
He studied music at the Conservato
Leipzig, under Alois Reckendorf un
1899, and under Eugen d'Albert
Frankfort-on-Maine.
Since 1900 he has made man
concert tours throughout Europ
and America, and his brilliant and
astonishing technique has won for
him a reputation as one of the foremost pianists of the day. In 1905 he won the Rubinstein Prize in Paris, and in the same year was appointed Professor of the Piano at the Royal College of Music in Manchester.

Backhuysen, Ludolph (1631–1708), Dutch painter, *b.* at Emden, Hanover. His masters were Everdingen and Dubbels. He is famous as a painter of seascapes, which are marked by their vivid realism.

Back-lash, the jarring reaction when the motion of a cogwheel or set of connected wheels is altered or when sudden pressure is applied.

Backnang, a tn. of Würtemberg, Germany, on a trib. of the Neckar. It has tanneries, and manufs. boots and cloth. Pop. 8840.

Backwardation, a term used on the Stock Exchange for a sum of money paid by a seller of stock to the buyer in order that he may delay its delivery until the following account.

Backwell, Edward (*d.* 1683), a London goldsmith and banker at Unicorn, Lombard Street, one of the founders of the system of bank-notes. He had financial dealings with Oliver Cromwell, Charles II., and the queen-mother, most of the nobility of the day, and with the E. India Company and sev. leading city firms. In 1662 he was sent to Paris on the matter of the sale of Dunkirk, and was employed on many secret services between Charles II. and Louis of France. He was alderman for Bishopsgate 1657, and M.P. for Wendover, 1679 and 1680.

Bac-Ninh, or **Bak-Ninh**, cap. of the prov. of Bac-Ninh, is in Tong-king, about 16 m. N.E. of Hanoi. It was captured by the Chinese in 1884; pop. of prov. 396,000.

Bacolod, or **Bacolot**, former cap. of Negros, Philippine Is., now of the prov. of W. Negros. It is noted for its fishing; pop. 19,360.

Bacolor, a tn. of the prov. of Pampanga in the is. of Luzon, Philippine Is., situated 40 m. N.W. of Manila. The is. grows spice, and has a pop. of about 10,000.

Bacon, *see* PORK.

Bacon, a tn. on the W. coast of the Camarines Isthmus, Luzon, Philippine Is., in a fertile dist.; pop. 13,000.

Bacon, Anthony (1558–1601), a diplomatist, elder son of Sir Nicholas B., and brother of the great Francis B. In 1573 he went into residence at Trinity College, Cambridge, his tutor being John Whitgift, afterwards archbishop of Canterbury; in 1576 he was admitted with his brother 'ancients' of Gray's Inn. In 1579 he undertook a long continental tour, when he made the acquaintance of Montaigne, the essayist, Danæus, an eminent Protestant theologian, and many of the leaders of the court of Henry of Navarre. He returned to England in very bad health in 1591. In 1592–3 he was returned to parliament as member of Wallingford. In 1593 he entered the service of the Earl of Essex, and undertook to keep him posted in foreign information, and as his private 'Under-Secretary of State for Foreign Affairs,' was in [illegible] munication with numer- [illegible] ny of Bacon's letters remain in manuscript, much of which is preserved in Lambeth Palace Library. In 1597 he was returned to parliament as member for Oxford. See Dr. Abbot's *Bacon and Essex*, 1877; Todd's *Cat. Lambeth MSS.*

Bacon, Delia (1811–59), an American authoress, sister of Leonard B., *b.* at Tallmadge, Ohio; a schoolmistress, and a lecturer in history and literature at classes for women. Wrote sev. stories: *Tales of the Puritans*, 1831; *Bride of Fort Edward*, 1839. Though the idea did not originate with her, she was one of the earliest and most enthusiastic supporters of the theory that Shakespeare was not the writer of the plays called by his name. She came to England to study the question, and became a friend of Thomas Carlyle and Nathaniel Hawthorne. In 1857 she pub. *Philosophy of the Plays of Shakespeare Unfolded*, in which she expounded her theory that the so-called Shakespeare plays were written by Francis Bacon, Edmund Spenser, Walter Raleigh, and others in order to set forth a philosophy which, nevertheless, they did not care to own publicly. Her mind became unhinged, and she returned to America, and *d.* at Hartford (Conn.). Hawthorne recounted his friendship with her in a chapter of *Our Old Home*, (1863), 'Recollections of a Gifted Woman.'

Bacon, Francis (1561–1626), Lord Verulam and Viscount St. Albans, commonly but inaccurately called Lord B.; lord chancellor and philosopher, was *b.* at York House in the Strand, London, Jan. 22. His father was Lord Keeper Nicholas B., who ranks high among great Elizabethan statesmen, and who held the seals of office for twenty years. His mother was Ann, second daughter of Sir Anthony Cooke, a well-educated woman and a zealous Calvinist. In 1573 Francis entered Trinity College, Cambridge, and in 1575 Gray's Inn.



FRANCIS BACON

It is said that while he was still at college he determined upon pursuing that course which should bring about the new philosophy. It is said that he himself regarded his profession as a means to this end. However, the death of his father in 1580 left him with comparatively little influence, and so he was dependent upon patronage. Henceforth his life must be considered in two aspects: the political career and the literary, both so distinct and contradictory that, to a casual observer, it seems that Pope's saying is suitable to him, 'The brightest, wisest, meanest of mankind.'

After failing to obtain help from his uncle, Lord Burleigh, he was aided very considerably by the Earl of Essex, whose unfortunate career in Ireland terminated too quickly to allow of his giving B. much further help.

Now occurs the period of which the most capital has been made by B.'s enemies. He had to manage the queen and Essex; he evidently did attempt to mediate honestly between

them. But this having failed, what is certain is that he offered himself as counsel for the prosecution against Essex. He himself said in his *Apology* that he did so in the hope of helping his unfortunate patron. What was more generally believed was that he saw that he had gone too far, that he had offended the queen, that the fall of Essex meant his own ruin, and so he altered his plans accordingly. He made little attempt to save his friend. Moreover, when the queen wished to vindicate her action, it was B. who wrote *A Declaration of the Practices and Treasons attempted and committed by Robert, Earl of Essex*, and later apologised by saying that the maintenance of the state was more important than the ties of friendship. In the last years of Elizabeth's reign B. tried to act the part of mediator between queen and people. With the accession of James he found his chances of promotion increased. He was knighted on coronation day, and in the same year married Alice, daughter of Alderman Barnham. In 1604 he was made a king's counsel, and given a pension of £60 a year. In 1607 he became Solicitor-General, and in 1612 At-torney General. He exerted himself o bring about the union of England nd Scotland, and at the same time usied himself in writing. His ser-ility during this period is usually ustrated from the cases of St. John d Peacham. In 1616 B. was the osecuting counsel in the Overburg urder case, and next year secured e dismissal of Coke, his rival, from e King's Bench. He next attached nself to the new favourite, Buck-ham, who at first did his best by ng his influence on behalf of B. 616 B. became a Privy Councillor, in 1617 was appointed Keeper of Great Seal, and was raised to the age as Lord Verulam. The years hich he held office Macaulay res among the darkest and most eful in our history. He allowed ingham to interfere in his deci- in the Court of Chancery, and e time actually cancelled his nent of a case and ordered it tried again in response to a ptory letter from Buckingham. quiesced in the execution of , and in the project of a marriage. A great deal of aladministration of the time e ascribed to the weakness of g and the power of the e. But it is impossible to e the lord keeper. At this practice of granting mono- rewards was at its height. s were armed with such great at they could over-ride all law and order. But B., when he was asked to interfere, practically decided in favour of extending these powers. However, his fall was close at hand. The period of the Addled Parliament of 1614 had been succeeded by seven years in which the nation was governed absolutely by the Crown. In 1621 want of money forced the king to convoke another parliament. If he and his ministers had understood the temper of the people it is possible that they would not have done so. Immediately parliament assembled, the Commons proceeded in the most reasonable manner to discuss the granting of monopolies, under cover of which Buckingham and his friends had so oppressed and robbed the people. Buckingham began to fear for himself, and so proposed a plan by which certain people were to be sacrificed to the House to save others. Sir Giles Mompesson and Sir Francis Mitchell were first given over to impeachment. It was not long before B. understood that he, too, was to be abandoned. The Commons, led by B.'s enemy, Coke, appointed a committee to inquire into the state of the courts of justice. On March 15, 1621, the chairman reported that great abuses had been discovered. 'The person,' said he, 'against whom these things are alleged is no less than the lord chancellor, a man so endued with all parts, both of nature and of art, that I will say no more of him, being not able to say enough.' There were twenty-three specific charges which were put before the Lords temperately enough. The evidence was so clear and irrefutable that the lord keeper's friends could only ask for suspension of judgment. B. himself seems to have realised the hopelessness of his position. He became ill, and from a letter written at the time he seems to have had no wish to recover. The inquiry was proceeding when the adjournment of parliament gave him a short respite. On the reassembly of the houses B. admitted practically everything, and renounced all defence. He was condemned to pay a fine of £40,000, and to be imprisoned during the king's pleasure. He was removed from his offices, declared incapable of holding any other, and banished from court. The sentence was undoubtedly severe, but probably none of the judges thought it would be carried out in its entirety. B. was indeed imprisoned in the Tower for two days as soon as his health improved, but at the beginning of 1624 he received a full pardon. The argument that such bribes and fees were the customary emoluments of the law officers of the day, and that therefore B. was simply used as a

scapegoat cannot be admitted for a moment if we consider B.'s own view of the matter. True, at first he denied all the allegations with great indignation. But later, when he found himself deserted by his powerful friends, the king and the favourite, his attitude shows clearly his own condemnation of himself. Not once does he hint that presents are the same thing as fees. He never attempted to defend himself now, as he had done in the prosecution of Essex. In his final 'confession and submission' he goes over all the charges, and, with the exception of a few unimportant denials, declares himself guilty. 'I do plainly and ingenuously confess that I am guilty of corruption, and do renounce all defence and put myself upon the grace and mercy of your lordships;' and again, at the end, when he had stated all he could in favour of himself, 'I do now again confess that, in the points charged upon me, though they should be taken as I have declared them, there is a great deal of corruption and neglect, for which I am heartily sorry, and submit myself to the judgment, grace, and mercy of this court. For extenuation I will use none concerning the matters themselves.' The most remarkable comment on his case and on the state of the courts in England is his own statement, made some years later, 'I was the justest judge that was in England these fifty years; but it was the justest judgment that hath been pronounced these two hundred years.' No judges could have been more favourable to him than those who tried him. He was spared all public humiliation as far as possible. After 1624 he was at full liberty to return to court, and even to take his seat in the Lords, had he desired to do so. He received a pension of £1200 from the gov., and his magnificence was as great as ever. This carelessness in money matters may explain some of the passages in his confession; it is certain that it brought him into difficulties during the last years of his life. He was forced to sell York House, and to live at Gray's Inn while in London. Yet, during these years he rendered such services to letters that the world must regret the years that had been wasted, Sir Thomas Bodley said, 'on such study as was not worthy of such a student.' In 1622 he completed his *History of King Henry VII.*, and in 1623 his *De Augmentis*, and in 1625 ... best collection of jests in the world, *Apophthegms New and Old.* ... political tracts and valuable additions to what he had already written were the product of this part of his life. In 1626, while travelling in his coach near Highgate, he c... a chill while performing an ex...ment. He considered that exc... cold might serve to prevent an... tissues from putrefaction. On ... particular day he alighted from ... coach to stuff a fowl with sno... order to test his theory. Alm... immediately he became ill and ... taken to the Earl of Arundel's ho... Here he d. on Easter Day.

It is by the *Essays* that B. is b... known to the general reader. F... pub. in 1598, they appeared as ten in number; later, as successive eds. were issued, they became more; in 16... they were nearly four times as man... and in 1625, the last ed. pub. durin... his lifetime, nearly six times as many. These *Essays* differ greatly from h... later works. They are simply observations he had made, and rules he had found to be true, in his way through life, and are set down unceremoniously. There is hardly any attempt after 'style'; in few is there any deliberate seeking after order. In 1598 they read almost like notes, and although they are recast later, the same ruggedness of outline remains. For what is considered his greater work he had a different manner of writing. As far as subject matter, truth, and beauty are concerned he rarely surpassed the *Essays*, but his style was becoming constantly richer, softer, and more melodious. In 1605 he dedicated to the king *Two Books of the Proficience and Advancement of Learning, Divine and Human.* In 1623 he expounded this into the Lat. treatise, in nine books, entitled *De Augmentis Scientiarum.* In 1610 he gave to the world his *Wisdom of the Ancients* (*De Sapientia Veterum*), a fanciful interpretation of old classical mythology, but none the less a brilliant piece of work. In 1620, just before his fall, appeared what is undoubtedly the greatest of his works, the two books of his *Novum Organum Scientiarum*, or new method of scientific discovery, in which he announced what he thought to be a previously unthought of method of questioning nature, and extorting her secrets from her. This work was to be the second part of a great scheme, 'Instauratio Magna,' or the Great Restoration, *De Augmentis* being the first, the whole to be completed in six books. In 1622 he pub. the *History of the Reign of King Henry VII.*, and, as before stated, his marvellous industry continued to the end. Of these books, the *Advancement* must be considered as a call to a great cause. It is evidently a hurried production, and is not well arranged. Yet it is a work whose influence is even now at work.

It was the first of a long line of books, the purpose of which was to teach people the use of knowledge, how, why, and what to know. B. considered it merely a beginning; the *De Augmentis* was a development of it, and in his later Lat. works he sought to go farther in the road he pointed out first of all. In the *Novum Organum* he reverted to the form of aphorisms. He worked twelve years on this book, and carefully weighed every word. It developed into a war on the world of science as it was then; and declared that all knowledge must be begun again, by a new and, as he thought, infallible method. The first book simply prepares; in the second book, with the eleventh aphorism, he declares his own method. It is usually said, mistakenly, that he rediscovered the method of induction as opposed to that of deduction. The method of reasoning then in vogue had been to accumulate instances without following any rule of selection; that is, a theory was formed, and then was supposed to be proved if instances could be accumulated which agreed with the theory. B., on the other hand, pointed out the advantages of the experimental method. Given an effect, work backwards to the cause or causes; experiment then to discover if the cause produces the effect. B. elaborated this method of exclusions, but, as Macaulay points out, it is ridiculous to say that he discovered the method of induction. Intrinsically, his method was valuable. He saw the force of causation and that the real object of science should be to find out causes. He has eceived much credit for this. The mazing discoveries of modern science re, not without reason perhaps, as- gned to his awakening. But when e come to examine details we find at the most surprising divergence opinion exists among competent dges. Some of his most ardent mirers have come to the conclusion t as an instrument and real thod of work B.'s plan was a ure. B. claimed that his method infallible and mechanical, and ; it would reduce all minds to the e level in the task of obtaining vledge. To have made such an tion shows that he could never understood the possibilities of human mind. Again, his ex- tion of the science of induc- s not clear enough to be satis- y. His own conclusions are unverified or merely negative. onception of the meaning of phy was altogether too nar- nbracing as it did merely the sciences. Finally, his method ogether too mechanical.

Yet with all this he has a p eminent place in the history of scienc The principles on which he worke were the only true ones, and he pr pounded them systematically an earnestly. He showed that intell gent, patient examination of thing was the only way to knowledge. He wished to make a new world, happier than the old in the possession and pursuit of knowing. He was keenly alive to the needs and pains of human life, and thought it no shame to use knowledge to alleviate them, in 'charity to man, and anxiety to relieve his sorrows and necessities . . . for this should men study to be perfect in.' Certain it is that his conclusions were often vague and untrue; that he himself did not know the immensity of what he aimed at; equally certain is it that he expressed what had broken in on other minds before in such terse, beautiful language that men were bound to answer the call and follow the gleam. Unfinished though his great scheme of the Restoration was, yet the *Novum Organum* was a worthy crown. He had intended much more, and there remains a vast amount of unused or neglected material which shows how it was thought out, arranged, and recast. It was written and re-written twelve times over before its publication. Mr. Ellis says that the scheme for the *Instauratio Magna* was as follows: 'The first book contains a general survey of the present state of knowledge; in the second men are to be taught how to use their understanding; in the third all the phenomena of the universe are to be stored up . . .; in the fourth examples are to be given of its operation . . .; the fifth is to contain what B. had accomplished in natural philosophy *without* the aid of his method . . .; the sixth will set forth . . . the results of the application of the new method to all the phenomena of the universe.'

Doubtless, to the ordinary reader, the most interesting claim in regard to B. is that which assigns to him the authorship of Shakespeare's plays, together with that of many other works of the period. The war of Shakespearians *v.* Baconians has produced much writing and not a little acrimony. For years researches have been carried on in order to clear up the so-called mystery of Shakespeare. The arguments of the Baconians may be summed up briefly as follows: Francis B. was undoubtedly, if we exclude the author of Shakespeare's plays, the greatest mind of the Elizabethan epoch. To him alone, still assuming that William Shakespeare was not the true author,

can be credited the production of those marvellous plays. Countless passages in them may be paralleled in his own writings. Moreover, the sonnets, the 'key with which Shakespeare unlocked his heart,' and which open to such a shadowy portal, are peculiarly applicable to B. But it is upon negative evidence that most stress is laid. We have only five specimens of the handwriting of Shakespeare, and taking the signature, which occurs in all, we see that it is by no means clear, and certainly not what we would call an educated hand. The evidence is far from being conclusive. Certain enthusiastic supporters of the Baconian theory pin their faith to cyphers obtained by poring over the first folio of Shakespeare's plays, pub. in 1623. Perhaps the most important of these believers are Sir Edward Durning Lawrence and Dr. Orville Owen. The latter, after thirty years' research, claimed to have discovered a cypher which would lead him to the discovery of manuscripts which B. buried in the bed of the Wye. According to the cypher, he said that B. originally buried his treasure near Chepstow Castle; then later, fearing their discovery, removed them and placed them in an excavation in the mud of the Wye which he formed by diverting the course of the riv. by means of timbers. No measurements were given, but the place was indicated by means of a Rom. ford and a reference to a cleft in the cliff. During Easter week, 1911, Dr. Owen, assisted by the Duke of Beaufort's workmen, discovered timbers which seemed to be between 200 and 350 years old, and which had not been part of a bridge. Later a type of cache was discovered. but then the work was discontinued, Dr. Owen's theory was that B. and Essex were the children of Elizabeth and Leicester, being the offspring of a marriage which took place in the Tower during Elizabeth's imprisonment there. At the age of sixteen B. discovered this, and in a fit of anger the queen admitted it. Not daring publicly to resent his position, B. confided it to cypher writings, and, inspired perhaps by the story of Philip of Macedon, who buried all his treasures near a ford in the R. Oxus, B. determined to do likewise. It is conjectured that the literary secrets revealed will be even more interesting. Not only will Shakespeare's plays be proved his, but much of the work now attributed to Robert Greene, Peele, Marlowe, Spenser, etc. will be also made known as his. The stupendous nature of this claim is dismissed by the Baconians with the assertion that even then it will not be equal in bulk to the work of Sir Walter Scott.

Setting aside all these claims, even if B. is never proved to be Shakespeare, or Shakespeare B., it is enough that his already acknowledged work be accurately judged to place him in the front rank of the geniuses of the world. In one sphere alone, if it is granted that Macaulay's words are true, he 'moved the intellects that moved the world.' Whether he did more is doubtful; let us at least pay homage to him for what he has done.

Bacon, Henry (1866–1924), American architect, was born at Watseka, Illinois, and studied architecture at Illinois Univ. From 1888 to 1891 he gained experience working with arch. firms, but from then until his death in 1924 he practised independently. Among the notable buildings he designed, were the Union Square Savings Bank, N.Y., Public Library, Patterson, N.J., and the Whittemore Memorial Bridge, Naugatuck, Conn. He also designed monuments such as the Civil War and World War monuments, Yale Univ., and the Parnell monument in Dublin. The Lincoln Memorial, erected at Washington, 1920, was also his work.

Bacon, John (1740–99), an Eng. sculptor. Trained as a modeller and painter on porcelain. In 1769 a bas-relief representing the flight of Æneas from Troy won for him the first gold medal ever awarded by the Royal Academy for sculpture. In 1770 he exhibited a figure of Mars, and in consequence received the gold medal of the Society of Arts and was elected an associate of the Royal Academy. His rivals accused him of ignorance of classic style, and to repudiate the charge he executed a head of Jupiter Tonans. The best known of his works are the monuments of Pitt in Westminster Abbey and the Guildhall, of Dr. Johnson and Howard in St. Paul's Cathedral, and of Blackstone in All Souls, Oxford. He was buried in Whitefield's Tabernacle.

Bacon, Leonard (1802–81), American Congregational minister, editor and author, called 'the Congregational Pope of New England'; *b.* at Detroit, Michigan. Graduated at Yale University, 1820, and Andover Theological Seminary, 1823. In 1825 became pastor of the First Church, New Haven, with which he was connected till his death. Ed. the *Christian Spectator* 1826–38. He was one of the founders of the *New Englander*, 1843, and of the New York *Independent*, 1848, which he ed. in 1863. 1866–71 professor of didactic theology at Yale University, and from 1871 till 1881 of church polity and

American church history. A keen advocate of temperance and of the abolition of slavery, and a writer of hymns.

Bacon, Nathaniel (1593–1660), a Puritan lawyer. Member of the Long Parliament, 1645–60. Wrote an *Historical Discourse of the Uniformity of the Government of England.*

Bacon, Nathaniel (1642–76), born in England, but emigrated to Virginia, where he became a member of the governor's council. Headed an expedition against the Indians, in defiance of Governor Berkeley's policy. Was proclaimed a rebel, captured, tried, and acquitted. B. and his supporters demanded a reduction of taxes and an extension of the suffrage. Being for a second time proclaimed rebels, they marched on Jamestown, which they captured and destroyed, but B. died before he could carry out any of his reforms.

Bacon, Sir Nicholas (1509–79), Eng. statesman, father of Francis B. by his second wife Anne, daughter of Sir Anthony Cooke. He graduated at Corpus Christi College, Cambridge, in 1527, after which he entered Gray's Inn and was called to the Bar, 1533. In 1537 he became solicitor of the Court of Augmentations; 1546 attorney of the Court of Wards and Liveries; 1550 he became a bencher, and in 1552 treasurer of Gray's Inn. After the dissolution of the monasteries, 1539, he received a large share of the forfeited estates from Henry VIII. During Mary's reign, his Protestantism cost him many of his emoluments, though he retained his office in the Court of Wards. On the accession of Elizabeth, 1558, he became a Privy Councillor and Keeper of the Great Seal. In 1559 he was knighted and was allowed to exercise full jurisdiction of Lord Chancellor. He and his brother-in-law, Cecil (afterwards Lord Burleigh), had the ordering of eccles. matters. He had . keen political hatred for Mary, Queen of Scotland. Founded a free grammar school at Redgrave. Buried St. Paul's Cathedral.

Bacon, Robert (*d.* 1248), the first Dominican writer in England, the brother, or, according to some authorities, uncle of Roger Bacon. He was educated at Oxford and Paris, joined the order of the Dominicans, and (possibly) succeeded Edmund Rich as treasurer of Salisbury Cathedral in 1233. He rebuked Henry III. for his fondness of foreign advisers, notably Peter des Roches. He wrote a Life of Edmund Rich, *Liber in Sententias Petri Lombardi*, *Sectiones Summariæ*, and other works.

Bacon, Roger (*c.* 1214–94), an early philosopher and scientist, author of numerous treatises; *b.* near Ilchester, Somerset. Educated at Oxford, where he took orders in 1233. Went to Paris for study and returned about 1250, when possibly he joined the Franciscan order. His learning won for him the title of 'Doctor Admirabilis.' His brother friars were jealous of his ability, and his research in physics and chemistry caused him to be suspected of dealings in the black arts and gave rise to doubts as to his orthodoxy.

In 1257 his lectures at Oxford were interdicted, and he was imprisoned in Paris. During his confinement he was requested to send to Rome a copy of his work, which the Pope, Clement IV., had been forbidden to read at the time when he was Guy de Foulques, papal legate in England. B. accordingly wrote his *Opus Majus*, which he followed up in 1266 with *Opus Minus* and *Opus Tertium*. It is not known what Clement thought of them, but at any rate B.'s release was effected, and in 1268 he was back in England. Ten years later his works were again condemned as heretical, and his second imprisonment, which lasted fourteen years, was sanctioned by Pope Nicholas III. During this term of imprisonment he wrote many treatises, including *De Retardandis Senectutis Accidentibus*. He was released in 1292, and *d.* about 1294.

B.'s fame has increased of late years. The *Opus Majus* is a storehouse of information. In it he showed up the vices of the theology of his time, expounded the necessity of reformation in the sciences by a careful study of nature, and descanted generally on alchemy and other sciences. B. discovered errors in the existing calendar, and his rectified calendar may be seen at Oxford. He had a practical knowledge of chemicals in advance of his age, but he shared in certain popular beliefs with regard to alchemy, the philosopher's stone, and the doctrine of signatures.

Bacon Beetle (*Dermestes Lardarius*), a destructive species of beetles, which attack bacon, dried foods, and stuffed collections. The insect is small and black, with the exception of the root end of the wing, which is golden-brown and dotted with three dark spots.

Bacon-Shakespeare Controversy, *see* BACON, FRANCIS.

Baconthorpe, Bacon, or Bacho, John (*d.* 1346), an Eng. schoolman and philosopher, called the 'Resolute Doctor'; the grandnephew of Roger B. He entered a Carmelite monastery near Walsingham, graduated at the university of Paris; became the head of his order in England, 1329–33.

In 1333 he went to Rome, and returned to England in 1346. He preached the doctrines of the Arabian philosopher Averrhoes (*q.v.*), and wrote commentaries on the Bible and numerous treatises, including *Commentaria super Quatuor Libros Sententiarum*, Paris, 1484. Consult Aymers (Turin, 1667–9) and Zagalia (Ferrara and Parma, 1696–1706).

Bács, or Bács-Bodrog, formerly a co. of S. Hungary, being a plain lying between the Danube and Theiss, which rivs. are joined by the Bács or Franzens Canal, constructed between the years 1796 and 1802. In 1920 the greater part was allotted to Jugo-Slavia, the remainder has a pop. of 115,220 of whom 28 per cent. are Germans. Wheat, maize, and fruit are produced and horses bred. The capital is Baja (*q.v.*).

Bacsanyi, Janos (1763–1845), Hungarian poet. His first pub. work was *The Valour of the Magyars*, a poem. He edited the *Magyar Museum*, which was suppressed by the gov. as advocating dangerous liberalism. He was complicated in the conspiracy of Bishop Martinovitch, and suffered imprisonment. During the remainder of his life he suffered persecution.

Bacteria are microscopic organisms which have no chlorophyll and consequently are unable to synthesise food from simple inorganic materials. In many respects they closely resemble the Fungi and simpler Algæ, and so are regarded as plants and grouped as Schizomycetes on account of their reproduction by fission (Gk. *schizein*, to cleave). The names bacilli, microbes, micrococci, micro-organisms, and germs are also popularly applied to the group as a whole. Their multiplication is so rapid that they may produce more than 16,000,000 in a day, and they are so minute that about 2500 of some of the larger forms, placed end to end, would measure about one-tenth of an inch. Others cannot be seen even under the highest magnification of the microscope, and their presence is detected, or rather deduced only from their effect on other organisms in which they cause some of the most virulent diseases. Such ultra-microscopic forms are included with the filterable viruses, because they pass through the pores of a porcelain filter. If the pores be fine enough, the virus may be separated from the microscopic B.

Classification.—The classification of B. is unsatisfactory, because the main diagnostic feature on which it was originally based was that of the shape of the cell. This method has been in use so long, and has consequently collected so much nomenclature founded on this feature, that there are obvious disadvantages to the medical profession in replacing it by a newer system of terminology. Moreover, the ready recognition of external form is of great importance in clinical work. Such a system of classification is, however, not really scientific, and the Society of American Bacteriologists has suggested a system comparable to that of the higher plants.

The classification at present still in use in Great Britain divides B. into higher and lower forms. The latter, or Eubacterioles, are far more numerous, and include motile and non-motile unicellular organisms, consisting of a mass of protoplasm within an investment. Spores may be formed within the cells, and such spores are called endospores. Eubacteria are of four main types, and are classified according to their shape as:

(1) *Cocci.* These are spherical organisms reproducing by fission, but various members of the group divide in different ways, and so subdivisions, dependent on the mode of fission, have been formed.

(*a*) In *Streptococci* the divisions occurs in only one plane, and the cells are held together in a row by their gelatinous investments.

(*b*) In *Staphylococci* divisions may occur in any plane, and so will result in the formation of an irregular mass of cells.

(*c*) *Micrococci* in fission form groups of four or multiples of four by division in two planes at right angles. Two of these cells, remaining in contact after the separation of the groups, are sometimes described as a diplococcus, but this term has no significance in classification, as every coccus in fission must pass through a diplococcus phase.

(*d*) *Sarcinæ* divide in three planes, two longitudinal and one meridional, at right angles to one another, and so form groups of eight.

(2) *Bacilli* are rod-like B. which are really cylindrical. The main axis of the cylinder may be relatively long or short, and the ends may be flat or convex, so that under the microscope the bacillus looks like a rod with square or rounded ends. It may have flagella at the ends only, or all round the body, or flagella may be absent

(3) *Spirilla* are curved, rod-like forms. The curves may be undulatory or spiral; at each end of the motile forms are from one to twenty flagella.

(4) *Spirochætæ* are non-flagellate, motile, spiral, or undulatory cells, usually comparatively long and thin. Various types of movement are effected by the contraction of the cell,

and in some forms one end tapers so considerably that it is comparable to a flagellum.

The higher B. consist of branched or unbranched septate or aseptate filaments often invested with a gelatinous sheath. The units of these filaments resemble separate B., but the filament must be regarded as a simple colonial aggregate, for the units are interdependent and have sometimes a very special function. The unit at one end often fixes the organism, while that at the free end divides, abstricting spores called conidia, which can reproduce the bacterium immediately if conditions be favourable. The three chief orders of this group are:—

1. *Chlamydo-* or *Tricho-bacteria.* These are unbranched, filamentous forms, often with a narrow fixing base. They are mainly aquatic, and their envelope frequently contains iron oxide. Such forms are popularly described as 'iron B.'

2. *Streptothrices* are branched aseptate filaments which may produce special reproductive branches from which chains of rounded conidia are formed, or the filament may reproduce by dividing transversely into a number of rods.

[illegible] present, and the organisms may be free or attached. The free forms move by protoplasmic contraction.

The American Classification divides the B. into the six orders: [illegible] metales; [illegible] hiobac- [illegible], and 6. Myxobacteriales (see *General Systematic Bacteriology*, Buchanan). In this classification, B. producing diseases in human beings belong to orders 1, 2 and 5.

Structure.—Examined under the microscope, B. are seen as minute [illegible] usually colour- [illegible] f a mass of [illegible] by a definite [illegible] in character [illegible] ll of higher plants. Around this wall many B. have a gelatinous covering, which enables them to cohere and form a slimy mass such as may be found on the surface of stagnant water and round flower-stalks which have begun to rot. This cohesive mass is the zooglea (*i.e.* 'animal glue'). Some B. are coloured, but since the majority are not, their structure can be determined only with the aid of appropriate stains, usually aniline dyes. The presence of a differentiated nucleus has not been satisfactorily demonstrated, even in the larger forms, and from results so far obtained it seems unlikely that the cell contains an organised nucleus. The cells may contain food reserves of fat carbohydrate such as glycogen, and of other materials.

[illegible] and remain viable for months, or even years, awaiting the return of favourable conditions. Most B. are not killed unless they are subjected to extreme conditions.

Food [illegible] unt of their [illegible] food from [illegible] and mineral salts, B. have to live on food manufactured by green plants. In a few cases they do this directly by living within or on parts of the plant. For example, some species live on seeds, [illegible] ot the testa a [illegible] grow out m [illegible] ever, do it [illegible] or on animals and on decaying plant or animal matter. In fact, the B. themselves effect the decay by the [illegible] cause the death of their 'host' or are expelled, and then go on living as saprophytes. To effect decomposition the B. secrete enzymes or ferments capable of decomposing such substances as cellulose, lignin, protein and other compounds, and on this account are very useful to man (see below). On the other hand, some parasitic B., by decomposing blood and tissues, may cause great harm and even death. Some parasites are useful; those found in the intestine probably aid digestion.

The elements of food substances required by B. are practically the same as those needed by all plants—carbon, hydrogen, oxygen phosphorus, sulphur, nitrogen associated with the metals calcium, potassium and magnesium. Some species need iron, and sodium compounds are present in many. It is difficult to discover in exactly what form B. require these compounds, because any one species of bacterium is rarely found alone. Usually there are associations of several species, and each may modify the substratum, while the others may [illegible]

of the cholera bacillus. By the method of culture it is possible to discover the foods which some B. can use.

Methods and Uses of Culturing Bacteria.—In any medium where B. flourish freely there is a confusion of different forms, spherical, cylindrical, and spiral. Some species use up all the available nourishment and die or dwindle into spores. Other species enter and multiply, and are in their turn destroyed through the exhaustion of the food supply or by the poisons created in the medium by other species. The microbe population is thus always changing, and it is difficult to study their structure and actions unless each species can be separately collected. This may be done by sterilising a solution of agar-agar (obtained from a Japanese seaweed) to which has been added a food solution of materials similar to those on which the B. grow naturally. The sterilisation is carried out at a temperature which will not decompose the medium, and if it has to be as low as 57° C., sterilisation will take some days. If, however, it can be performed under pressure due to superheated steam, from twenty to thirty minutes will be long enough to kill any spores which have found their way into the medium. This is poured into sterilised flat dishes, Petri dishes, or into test-tubes sloped to expose a long slant surface of the agar. In the latter case the medium is usually sterilised in the tubes, which are plugged with cotton wool. If sufficient agar be used, the medium sets like a jelly, and is most convenient, because pieces on which B. are growing can easily be removed. Many other media are used for specific B.; the diphtheria bacillus grows on coagulated blood serum and the meningococcus on egg albumen. B. are scattered on the surface by adding a drop of water or liquid gelatine or by dipping a platinum needle into a mass of B. and quickly stroking it across the medium. If conditions be favourable, they divide, and the different types form separate colonies, which may be removed and subcultured separately on fresh media. In this way pure cultures may be obtained and subjected to experiments to determine the effect of changes in temperature, light, food materials, poisons, and other factors. Such researches may be invaluable in determining the most favourable conditions of life for disease-producing B., the means of ending their activities, and also the best conditions for the activities of B. of economic value.

Effect of Temperature.—Every organism has a temperature which is most favourable to its growth. Above or below this optimum temperature growth decreases until the limits beyond which it cannot take place are reached. These vary considerably, so that while for most B. the lower limit is about 12° C. and the upper about 40° C., a few will grow at 5° C., while those which decompose hay and dung grow well at about 60° C. Beyond the temperature limits endospores are frequently formed, so that though meat may be preserved in a refrigerator and milk by boiling, in neither case is it safe to assume that the B. are killed. Their activities, ended for a time, may be resumed if the endospores have survived and are given suitable conditions. Some B. have been found to survive temperatures required to liquefy hydrogen, while the sulphur B. flourish in hot springs at a temperature of 77° C.

Effect of Light.—As a rule, B. are destroyed in a short time by bright sunlight, and in any case develop more rapidly in the total absence of light. It has been found that the ultra-violet rays are most efficient in bactericidal action, and the electric arc which is particularly rich in blue-violet and ultra-violet rays, has been used with some success in the treatment of lupus by the Finsen lamp.

The action of the rays is limited, however, to the superficial tissues of the body; B. which are more than a centimetre from the surface remain unaffected. Increasing use of ultra-violet rays is being made in bacterial infections of skin, nose, and throat, and investigations on their effect on other glandular structures are proceeding.

Phosphorescence.—On a dark night luminous gleams may be seen on the surface of the sea. These are frequently due to B. living on organisms on the surface of the water or on fish. Other forms of phosphorescent B. are found on dead fish, putrefying meat, decaying wood and vegetables. The exact cause of phosphorescence is unknown, but oxygen is essential for its appearance. If phosphorescent material be put in an atmosphere devoid of oxygen, the light vanishes. Phosphorescence seems therefore to be the direct or indirect result of an oxidation process.

Bacteria and Oxygen.—Whereas most living organisms can exist for a very limited time without free oxygen some B. can live only in the absence of this gas. The bacilli causing tetanus (lockjaw), botulism (*q.v.*) ('meat-poisoning') and gas gangrene, a disease prevalent among the troops in the Great War, all flourish in the absence of oxygen, and are consequently termed anærobes. Other

B., ærobes, are unable to live unless oxygen be present, and to this type belongs the bacillus (*B. subtilis*) which is found in an infusion of hay. Many of the disease-producing B. are able to live equally well with or without oxygen.

Bacteria and Nitrogen.—Among the

plants are unable to use atmospheric nitrogen until it has first been converted into nitrates by the agency of bacteria. Leguminous plants, such as clover, peas, beans, etc., are so well served in this respect by particular B. that they actually leave the soil richer in nitrogen than when they were sown. The bacterium lives in the root of the plant, and its presence is indicated by the appearance of nodules or tubercles upon the roots. Plants which are affected by this bacterium grow more vigorously than plants grown in sterilised soil and free from nodules. Leguminous plants are therefore an important item in the rotation of crops, and artificial cultures of the B. concerned are prepared so that the plants may be as fully infected as possible and so be able to gain the greatest amount of nitrogen compounds. The bacterium is able to affect the conversion of the nitrogen into ammonium compounds, and then into nitrites and nitrates, which the plant may build into proteids. When the leguminous ts decay and the ss into the soil. of B. decompose them down into ammonium compounds and sometimes liberating free nitrogen. Some nitrifying B. live in the soil and can carry on the rebuilding process of ammonium compounds into nitrates available for the higher plants. Other nitrifying B. in the soil can build up the free nitrogen into the By the ac- and denitri- nitrogen in the atmosphere is kept approximately constant.

Bacteria in Industry.—Owing to their power of secreting ferments, B. are of great economic importance. The separation of the fibres of flax, is effected by the decomposing action of the B. on the tissues connecting the fibres. Those of jute and hemp are separated in a similar way. B. also play a part in the curing of tobacco, the preparation of indigo, the manufacture of vinegar from sour wine, the decomposition of dung for use as manure, leather tanning, and in the preparation of cream for butter. Sour milk may be produced by the action of many different bacilli; one of the best known of these is the lactic acid bacillus which during the fermentation produces the acid from which it is named.

Bacteria and Disease.—The connection of B. with certain forms of disease was conclusively demonstrated by Pasteur, though it had long been suspected that suppuration was due to the presence of organisms in wounds. The more superficial diseases due to B. entering wounds are caused by small spherical B., *streptococcus pyogenes* and *staphylococcus pyogenes.* They are constantly present where people are gathered together, especially in sick wards of hospitals and other places where there are persons affected with suppurative inflammation. Child-bed fever is caused by the same organisms, and undoubtedly many cases were occasioned by doctors and nurses carrying infection before the origin of the disease was known. The danger has been considerably lessened by the precautions taken to sterilise the hands a birth a ment in general

Streptococcus pyogenes may produce degrees of irritation varying from local redness to erysipelas, while *Staphylococcus pyogenes* is associated chiefly with suppuration. The B. infecting the deeper tissues of the wound are even more dangerous, and are gr of by th cessors.

The formation of pus when wounds are infected by these B. is due to the action of the *leucocytes*, or white corpuscles of the blood. They are single cells which in ordinary circumstances circulate with the blood-stream, but are capable of penetrating the walls of the blood-vessels into spaces in the tissues. The work they do is the engulfing and digesting of small particles of waste or foreign substances, and they thus serve as scavengers to the blood. When B. enter a wound the corpuscles make their way to the part affected. Here they proceed to ingest the B., but if these multiply more rapidly than the leucocytes can ingest them, they may penetrate to other parts of the body and cause abscesses. If, however, the leucocytes can cope with the they help in heal the wound. d corpuscles and

B. are discharged as a yellowish-white mass known as pus.

All the pathenogenic or disease-producing B. produce substances called toxins in the tissues or in the blood. If these toxins circulate in the blood-stream a general effect known as toxœmia is caused. The B. themselves in this case are incapable of invading other tissues, and remain localised as in tetanus. In other cases the B. themselves, as well as their toxins, circulate and multiply in the blood so spreading infection throughout the body and producing the conditions of septicœmia.

Bacterial Diseases of Economic Importance. Cholera.—For many years cholera has caused considerable mortality in tropical and sub-tropical countries where sanitation is bad, but the bacterium (*Vibris choleræ*) was first isolated by Koch in 1883. It is often called the 'comma bacillus' on account of its curved shape. It is usually taken into the body in contaminated water, and is able to move rapidly by vibrating a terminal flagellum. Although it may spread to other organs, it lives chiefly in the intestine. The onset of the disease is very rapid, and recovery, when it occurs, is equally rapid. While investigating the habits of the cholera bacillus a number of research workers have died through contracting the disease. Its cure is still very uncertain, but cholera may be prevented, and even modified in intensity, by inoculation. This treatment was discovered and first used in India by Haffkine (1895), and it has subsequently been used during wars to protect troops from the disease.

Influenza is a term loosely applied to similar conditions of feverishness and catarrh due to very different causes. From time to time, however, there have been widespread and devastating epidemics of such conditions, and the epidemic disease is described as epidemic influenza, to distinguish it from isolated non-epidemic cases. Epidemic influenza spreads rapidly and dies out rapidly, but often spreads so widely that it is best described as pandemic. After the pandemic outbreak of 1889–1892, two independent investigators, Pfeiffer and Kitasato, discovered what they believed to be the influenza bacillus in bronchial sputum, while a third observer, Canon, recorded it in the blood.

Further investigations carried on after the pandemic outbreak of 1918 revealed the presence of a filterable virus associated with the disease. This virus, discovered by Obitsky and Gates, 1921, has been confirmed by more recent workers. There is no satisfactory evidence that Pfeiffer's influenza bacillus is the cause of the disease, though frequently associated with it, and particularly with the catarrh which often accompanies influenza. Inoculation with vaccines of different germs has in many cases helped to prevent influenza or to reduce its intensity.

Leprosy has been attributed to various B., but the results of experiments are still inconclusive.

Plague.—Both bubonic and pneumonic forms are due to bacilli. The devastating Manchurian epidemic of 1911 was caused by direct infection through inhalation of the pneumonic bacilli. The bubonic bacillus is usually carried by rat fleas, which are also parasitic on man.

Relapsing fever is very common in the Mediterranean basin, and is produced by *Spirochæta obermeieri*, which is introduced into the body by lice or ticks. The disease also occurs in Asia and America, and receives its name because the fever reaches a maximum, after which the temperature soon becomes normal; a few days or a week later another rapid rise in temperature occurs, lasting a shorter time than the first attack, and disappearing rapidly. A third relapse may occur in a similar way. In Asia the death-rate from this disease is very high. The Spirochæta is a slender, fine, spiral organism with tapering ends. It can move quickly and multiplies rapidly in the blood and in the organs for a few days. Then, owing to the action of the leucocytes, it disappears gradually. The few remaining organisms multiply, and so produce a second feverish attack. Inoculation with serum containing anti-toxin has proved beneficial.

Syphilis.—As far back as the fifteenth century there are records of a disease which, from the descriptions, doctors recognise as syphilis, and Paracelsus says that he treated it with mercury, with some success. The organism causing it was discovered in 1905 by Schaudinn and Hoffman, and is regarded by some authorities as a Protazoon rather than a bacterium. Recent classifications, however, include it with the Spirochætæ and though its discoverers named it *S. pallida*, it is now called *Treponema pallidum.* It is able to remain quiescent for a time and then multiply more actively. Wassermann has devised a test that will show the presence of the disease even during the inactive period. Syphilis is highly infectious, and may eventually cause general paralysis and disintegration of the nervous system. It is now treated by organic arsenic preparations, salvarsan and neo-salvarsan.

Tuberculosis was shown by Koch in 1882 to be due to a non-motile bacillus which can survive for some weeks in drought, and in distilled water. Ejected in sputum, the bacilli may remain alive for two months or more. As the sputum dries up, particles bearing the organisms are blown about by the air, and may be inhaled or taken into the mouth on food. Fortunately the human body, when in good health, offers considerable resistance to the bacillus, but should this gain successful access to the tissues, the cells will divide actively and form little swellings, or tubercles round the infection. Sunlight destroys the B. in the superficial tissues, but cannot effect a cure of more deeply seated infections. A method of treatment which has met with some success is to deflate one lung if it be more badly infected than the other and so force it to rest for some time. Prolonged rest of an infected part enables the tissues in time to enclose the bacillus. Tuberculosis has decreased considerably since sanitation, conditions of housing and nutrition have improved, and better methods of treatment have been devised.

Typhoid fever is caused by motile bacilli which are considerably larger than those associated with tuberculosis. They enter the body with food or drink and multiply in the intestines, giving rise to toxins which, when carried to other parts of the body, produce the characteristic symptoms of the disease. The bacilli also invade other organs, and may be found in the spleen, liver and even the lungs. The bacillus does not infect the lower animals, and the disease is communicated by the excreta of infected persons, so that the elimination of typhoid fever is intimately connected with the methods of sewage disposal. An important feature is that the bacilli sometimes become lomesticated in the person who has ·ecovered from the disease, and al-hough no longer injurious to their ıost, are still capable of infecting ·ther persons. In this way local pidemics of typhoid may be caused. 'lies, too, may act as carriers, es-ecially in countries where sanita-on is bad. They may carry the ıcilli on their bodies or in their diges-ve system. During feeding, the .cillus may be ejected on food when e fly secretes saliva.

During the South African War and ɜ Great War, an anti-typhoid ɔcine was injected to prevent the ease. Two other types of fever, 'atyphoid fevers A and B, required arate specific injections, so that a le vaccine [T.A.B.] is now used.

'ellow Fever, which causes considerable mortality in West Africa, th West Indies and America, is attri buted to a filterable virus containing a species of *Leptospira*. Further investigations are being made.

Other Bacterial Diseases.—Diphtheria, tetanus, and pneumonia are well-known bacterial diseases. Others under investigation are meningitis, which occasionally becomes pandemic and which accompanies or follows pneumonia and may sometimes apparently be caused by the same bacterium. Of the four types of *meningococcus* known, only one at present can be combated by an ant-toxin serum. Encephalitis lethargica, sleepy sickness, is attributed to a filterable virus, and increasing numbers of cases are being recorded. The disease is nearly always fatal, and further research in its nature and cure is being made.

Rheumatism needs fuller investigation. Several workers consider the disease infectious and to be due to *Micrococcus rheumaticus*, but some doctors attribute it to toxins conveyed from such local infections as pyorrhœa and tonsilitis.

Many other diseases, such as foot and mouth disease, dis:emper and psittocosis, are almost certainly of bacterial origin, while probably filterable viruses are the cause of infantile paralysis, smallpox, chickenpox and measles.

Immunity.—Individuals and races vary in their susceptibility to bacterial disease, owing probably to some inherited constituents in the blood which render it favourable or otherwise to the development of B. Where individuals are found to be unaffected by injurious germs, they are said to enjoy natural or hereditary immunity. It is also possible to *acquire* immunity from a second attack of a disease by the changes induced in the body as a consequence of the first attack. When bacterial poisons are produced in the blood, the body-cells elaborate certain substances which unite with these toxins and render them harmless. A habit of forming such anti-toxins may be estab., with the result that on subsequent infection the body may already be in a condition to neutralise the effects of bacterial invasion. Thus people who recover from small-pox, measles, scarlet fever, and to a certain extent, typhoid fever, are protected from further attacks for a considerable time. The anti-toxin is usually specific—that is, it is only effective against one particular disease—and considerable progress has been made in the artificial preparation of anti-toxins to aid the natural resisting power of the body in fighting certain

diseases. For example, when a horse is inoculated with the poison produced by diphtheria bacilli, his cells are stimulated to bring forth the appropriate anti-toxin. The treatment is continued with larger doses of the toxin as the horse increases his resisting power by production of antitoxin. He is then bled and the serum or clear fluid removed from the blood and used to inoculate diphtheria patients, thus enabling them to combat the disease with greater prospects of success. Similar treatment is applied in cases of tetanus and botulism. Since a serum already contains the antitoxins, the immunity given by it is described as passive. Active immunity is given by vaccines which stimulate the body to produce its own antitoxins. Vaccines are emulsions of living or dead germs. The dead ones are usually obtained by heating the culture sufficiently; living ones are grown under such conditions that their vitality is impaired, so that when injected into the body they may readily be overcome by the leucocytes. The antitoxins formed usually remain in the body for some considerable time.

Both serums and vaccines may be used in prophylactic as well as in curative treatment. When the antitoxins disappear from the blood re-injection is necessary to preserve immunity. In vaccinations against smallpox (Jenner 1798) the antitoxins probably persist throughout life, though not in sufficient quantity to prevent an attack, but they probably never lose their power to modify it. For prevention, revaccination is necessary from time to time. The original anthrax vaccine (Pasteur 1880) was efficacious for only one year. Immunity for a longer period is given by the anti-anthrax sera now used. Jenner and Pasteur were the pioneers in vaccine treatment; epidemics and war conditions have stimulated research, with the result that various vaccines have been discovered and are prophylactic against influenza, typhoid and paratyphoid fevers, plague, dysentery and cholera, while endeavours to use others as curatives are being made in the treatment of boils and of tuberculosis.

B. also stimulate the cells of the body to produce substances called *opsonins*, which render the B. more susceptible to attack by the leucocytes. Vaccines thus help in securing immunity by inducing the form a tion of opsonins.

Bacteroids, a name applied to the bacteria which form tubercles on the roots of leguminous plants, *e.g.* beans living in symbiotic relationship with the plant.

Bactria, part of anct. Persia, corresponding to modern Balkh in Afghanistan, bounded on the N. by Sogdiana, on the S. by Ariana. Its early history is mythological. Conquered by *Cyrus c.* 540 B.C., when it was made one of the satrapies of the Persian empire. It was conquered by Alexander, and became a prov. of the Macedonian empire under the rule of Seleucus. About 255 B.C. Diodotus, a satrap, asserted his independence and founded a Græco-Bactrian kingdom which extended as far as the Kabul and the Indus. During the sixth century A.D. it was subjugated by the Turks, and came under the rule of Islam. The cap., Bactra, or Zariaspa (modern Balkh), was the cradle of the Zoroastrian religion.

Bactrian Coins have been found in the 'topes' or burial-places to the N.E. of Kabul. The inscriptions are written in the B. alphabet, an offshoot of the Iranian alphabet. The same characters are found on rocks near Peshawar and Kathiawar, which had been inscribed in the third century by Asoka, a great Buddhist emperor, with sermons on his faith. Dr. Isaac Taylor discovered that the numerals in ordinary use are the actual symbols of Indo-Bactrian letters found on the above-mentioned coins, *e.g.* 4 is the Indo-Bactrian letter ch, chatur (*cp.* Lat. *quatuor*), 5 is *p*, panchan (*cp.* Gk. πέντε). This alphabet was probably introduced into India after the conquest of Darius, then brought to Spain by the Arabs in the twelfth century, whence it spread throughout Europe, and was adopted in place of the more clumsy Rom. figures.

Bactris (Gk. βάκτρον, staff), a genus of American palms of small size, with slender stems which are much used in making light but solid walking-sticks. *B. maraja* produces a small fruit of pleasant taste; *B. acanthocarpa*, a fibre used in making nets.

Bactrites, a genus of fossil ammonitidæ with a straight instead of a spiral shell. The genus is found in Silurian and Devonian strata.

Baculites, a genus of polythalamous cephalopods belonging to the family of fossil Ammonites. The shell is elongated, straight, and conical. The chambers are pierced by a marginal siphon. B. are found in neocomian and cretaceous formations. The best specimens are to be found in the baculite limestone of Normandy.

Bacup, a modern municipal bor. and markt. tn. of the Rossendale div. of E. Lancashire, England. Cotton-spinning and power-loom weaving are the chief industries. There are also dye-works, brass and iron

foundries, coal-mines and stone quarries in the dist. Pop. 21,263.

Badagry, a small state and tn. in Nigeria, Africa. It does a considerable trade in palm-oil.

Badajoz, (1) a frontier prov. of W. Spain, formed in 1833 from dists. taken from the prov. of Estremadura. Pop. 644,625; area 8451 sq. m. The country is watered by the R. Guadiana, and there are low ranges of hills. The climate varies between extremes of heat and cold. The rainfall is scanty. The prov. suffers through lack of water and means of communication. The Madrid–Lisbon Railway passes through Villanueva de la Serena, Mérida, and Badajoz. Agriculture is neglected, but live-stock—acorn-fed swine, sheep, and goats—is reared. Lead and copper are found in small quantities. The important tns. are: B., the cap., 38,000; Almendralejo, 15,448; Don Benito, 21,031; Azuaga, 16,580; Villanueva de la Serena, 14,857; Mérida, 15,502. (2) The cap. of the Spanish prov. of the same name, situated on the l. b. of the Guadiana. The tn. is a natural fortress, built on a slight hill, which is crowned with the ruins of a Moorish castle. It is the Pax Augusta of the Roms. Later captured by the Moors, and in 1031 made the cap. of a small Moorish kingdom, when it was named Bax Augos, or Bathal-us. In 1168 held by the Portuguese, but retained its independence till 1229, when it was captured by Alphonso IX. As a key to Portugal it has been an important stronghold in times of war; 1660 besieged by the Portuguese; 1705 besieged by the allies in the War of the Spanish Succession. During the Peninsular War was unsuccessfully attacked by the in 1808 and 1809, and finally surrendered to Marshal Soult, 1811. It a scene of terrible slaughter when llington pillaged the city, 1812. prin. industries are woollens, on, leather, pottery, soap, and is a large trade in cattle. Pop. 00.

dakhshan, a dist. in Central Asia, led on the S. by the Hindu Kush and by the Amu Darya on the here are beautiful woods, fer-lleys, and much pasture land. lers speak with the highest of its orchards and flower-s, its fruit and nightingales. visited by Marco Polo, 1272–3, General Wood, 1837–8. The are Tajiks, an Aryan race, Persian. They are Moham-Cap. Faizabad. Iron, lapis-nd rubies are found. Many animals are to be found which may be mentioned the e, camels, wild sheep, wolves, foxes, jackals, bears, boars, a[nd] leopards. Originally belonged to th[e] Gk. Bactria. From the thirteent[h] century onwards governed by the so-called descendants of Alexander th[e] Great. In the eighteenth century [it] belonged to the empire of Nadir Shah. In the nineteenth century it was captured by the chiefs of the Kataghan Usbegs of Kunduz, but in 1859, Mir Jahanded Shah was reinstated and agreed to pay tribute to Afghanistan. In 1873 England and Russia agreed upon a frontier between B. and Afghanistan. Pop. about 100,000.

Badalocchi, Sisto (*c.*1581–*c.*1650), surnamed Rosa, *b.* at Parma. An Italian painter and engraver, pupil of Annibale Carracci, whom he and a co-disciple, Lanfranco, accompanied to Rome in 1606. There he executed two paintings for Verospi Palazzo, both representing Polyphemus and Galatea, and he assisted his master in some of his prin. works. On the death of Carracci, 1609, he went to Bologna, where he *d.* about 1650.

Badalona, a seaport in the prov. of Barcelona, Spain, 5 m. N. of Barcelona town. The surrounding dist. is rich in fruit. The tn. has pop. 39,360 and ship-building, sugar-refineries, and glass-works.

Baden, Free State of, Germany, lies between Alsace-Lorraine and Würtemberg, and is separated from Switzerland by the Rhine. It is divided into four dists., Constance, Freiburg, Karlsruhe, and Mannheim. The country is mountainous. The Schwarzwald, or Black Forest, has a maximum alt. of 4903 ft. The Neckar highlands are lower; to the N. of them begins the Odenwald. To the S. are the wide plateaus of the Ger. Jura, drained by the Rhine and the Danube. The tribs. of the Rhine on the B. side are the Neckar, Murz, and Elz. The N.E. territories are bounded by the Maine. There is one lake, Constance. The Rhine valley is very warm, and the soil rich and fertile. Fruit and vegetables of all kinds, grain, hemp, tobacco, and wines are produced. Cattle are reared, and the production of honey is important. Clocks and straw-plaiting are the chief industries, and the jewellery of Pforzheim is well known. Other manufs. are ribbons, cottons, brushes, paper, cigars, leather, rubber goods, machinery, mirrors, and chemicals. Limestone quarries are worked, and there are important clay and gravel pits. Coal, zinc, gypsum, salt, and soda are found. There are as many as sixty mineral springs. School teaching is excellent. There is a Protestant university at Heidelberg and a Roman Catholic one at Freiburg. There are

209 general hospitals. The early inhab. were Alemanni, who fell under the dominion of the Franks; 496, conquered by Clovis and christianised; 748, Pepin the Little abolished the dukedom of Alemanni. In the eleventh century Duke Berthold built the castle of Lähringen in Breisgau and started the house of Lähringen. His second son Hermann took the title of margrave, and became the ancestor of the still famous house of B. In 1715 Margrave Charles William built Karlsruhe. His grandson, Charles Frederick, succeeded in 1746; he favoured the policy of Napoleon, joined the confederation of the Rhine, and in consequence doubled his estates, and gained the title of elector and grand-duke. In 1811 he was succeeded by his grandson, Louis Frederick, who seceded from the confederation of the Rhine and in 1815 joined the Ger. confederation. In 1830 Leopold succeeded his half-brother Ludwig, and his rule began with a contest between Liberals and reactionists. In 1846 the constitutionalist Bekk was made Minister of the Interior, and Liberalism had the upper hand. In 1848, at the time of the Revolution in France, Hecker and Struve drove out the grand duke and estab. a republic. The latter was reinstated by the Prussians, July 1849. In 1866 B. joined Austria against Prussia, and, when peace was made in the following year, joined the N. Ger. confederation. 1870–1 fought in the Franco-German War and became part of the restored Ger. empire. Although he was very popular, the Grand Duke was obliged to abdicate after the collapse of the Ger. empire. His successors in power thanked him publicly in the name of the people. The National Assembly of Baden voted the new constitution on March 21st, 1919. 54 per cent. of the pop. of 2,213,500 are Catholics, and 38 per cent. belong to the United Evangelical Protestant National Church reorganised in 1919.

Baden, or Oberbaden, a watering-place in the Swiss canton of Aargau, on the l. b. of the Limmat. Famous for its sulphur baths (the Aquæ Helvetiæ of the Romans), which reach a temperature of 117° F. From the fifteenth to the eighteenth century it was the seat of the Swiss diet. Pop. 9220, but visited yearly by 20,000 persons.

Baden-Baden, in the valley of the Oos, at the edge of the Black Forest, 8 m. from the Rhine. A famous resort of society people of all nationalities. The season lasts from May to Sept., and there is a brief winter season. The gaming-tables were once famous, but were abolished in 1872. There are medicinal springs composed of iron, magnesia, lime, and sulphur, and varying in temperature from 115° to 150° F. On the summit of the Schlossberg are the ruins of an old castle, destroyed by the Fr. in 1689. The 'new castle,' built 1479 and likewise destroyed in 1689, has been restored. There were 76,170 visitors in 1926.

The city was founded in the second century A.D. by Hadrian (*Civitas Aurelia Aquensis*). Rom. antiquities and the remains of a vapour bath and dungeons have been found. Pop. 25,700.

Baden-bei-Wein (Baden near Vienna), a fashionable resort of Lower Austria, in the valley of the Wienerwald, 16¾m. by rail from Vienna. Known to the Roms. as Aquæ Pannonicæ. Famous for sulphur springs, which are visited annually by over 50,000 persons. These springs vary in temperature from 79° to 104° F., and are recommended for gout, rheumatism, and all kinds of skin diseases. Pop. 22,230.

Badenoch, a dist. in the S.E. of Inverness-shire, Scotland, 45 m. in length and 19 m. in breadth. It is traversed by the Spey. Gneiss rock and granite are found.

Baden-Powell, Robert Stephenson Smyth (Baron Baden-Powell of Gilwell), *b.* in London, Feb. 22, 1857, son of the Rev. Professor Baden-Powell of Oxford. He had for godfather Robert Stephenson, son of the 'father of railways'; and his mother was descended from Capt John Smith (1579–1631) of Virginian fame. Until he was nearly twelve, he lived an outdoor life; then he went to a preparatory school, and in 1871 (with his younger brother) to the Charterhouse. He joined the 13th Hussars in 1876, with which he served in India, Afghanistan, and S. Africa. Assistant military secretary in S. Africa, 1887–9, in Malta, 1890–3; commander of the native levies in Ashanti, 1895; served with distinction in the Matabele campaign, 1896–7; raised to the command of the 5th Dragoon Guards, 1895. In the Boer War he won great popularity by his brilliant defence of Mafeking; in spite of famine and sickness, with a force of 1200 men he held the tn. for 215 days, till its relief on May 18, 1900. In recognition of his ability he was raised to the rank of major-general; inspector-general of the S. African constabulary, 1900; inspector-general of the cavalry, 1903–7. With the object of promoting a spirit of patriotism among the rising generations, he started the Boy Scouts movement, 1908, in which organisation he is Chief-Scout. He was knighted in in 1909 and raised to the peerage in

1929. Exhibited sculpture in the Royal Academy, 1907. Lieut.-Gen. commanding Northumbrian Territorial Division, 1908; retired, 1910. Among his publications are: *Pig-sticking or Hog-hunting*, 1889 (revised ed., 1924); *Vedette*, 1890; *Cavalry Instruction*, 1895; *The Matabele Campaign*, 1896; *Sport in War*, 1900; *Scouting for Boys*, 1908; *Quick Training for War*, 1914; *My Adventures as a Spy*, 1915; *Indian Memories*, 1915; *The Wolf-Cubs' Handbook*, 1916; *Girl Guiding*, 1917; *Aids to Scoutmastership*, 1920; *Old Wolf's Favourites*, 1921; *What Scouts Can Do*, 1921; *Rovering to Success*, 1922; *Life's Songs*, 1927; *Scouting and Youth Movements*, 1929.

Badenweiler, a vil. of Baden, Germany, noted for its alkaline thermal springs. It is near the Black Forest, and 3 m. from Mülheim. It contains remains of Roman springs. There were 10,200 visitors in 1926. Pop. 1180.

Badge, a device used as a distinctive emblem of families, countries, etc. It is a simpler and more primitive cognisance than the crest or coat-of-arms, and is not subject to the laws of heraldry. Bs., like crests and coats-of-arms, are usually symbolical in character, but on the one hand are distinct from the coat-of-arms as not being supported on a shield, and on the other hand are distinct from the crest as not surmounting a wreath. Famous badges are the *fleur-de-lis* of the Fr. kings, which can be traced back to the reign of Louis VII. (1137-80), the Tudor rose, the thistle of Scotland, the harp and trefoil of Ireland, and the cross of Christianity. Bs. are also worn as signs of office, or as a token of membership of some society, *e.g.* Solomon's seal and the mason's tools used as an emblem by Freemasons, and the primrose used as a badge by members of the Primrose League. Bs. are used by savage peoples to identify their arms and mark their belongings. From the B. the more elaborate devices of heraldry were evolved.

Badger (*Meles*), a genus of burrowg carnivores, constituting with the anks the sub-family Melidæ in the ustelidæ, or weasel and otter family. chief characteristics are short, ong legs, long and more or less ntigrade feet, and a pointed muzzle. has perineal glands, containing a stance emitting a fetid odour, h is thought to be of use in sexaction. The common B. (*M. taxus* *. vulgaris*) is found in the hilly and woody dists. of Europe and A but is now rare in Great Britain. colour is greyish-brown, with a w head marked with black lines runn from the nose to the back of the e It is about 2 ft. 6 in. long, and sta 1 ft. high. It is an inoffensive, solita animal, sleeping by day in subte ranean burrows which it digs for self, and wandering by night in sear of its food, which consists of roots, i sects, frogs, and the larvæ of wasp and bees. The American B. (*Taxide Americana*) is more carnivorous, an eats small animals such as marmots



INDIAN BADGER

Bs. are conspicuous for their shrewdness, perseverance, and courage. The cruel practice of badger-baiting, or drawing the B., was prohibited in England in 1850. A B. was kept in a barrel and attacked by dogs until it at last gave way and was dragged out. Then its owner released it from the dogs and put it back into the barrel to recover itself. This performance was continued during the day, and formed an attraction at public-houses of a low order. The verb 'to badger,' meaning to assail repeatedly, to worry, is probably derived from this practice.

Badger, George Percy (1815–88), an Arabic scholar, born at Chelmsford, Essex. His early life was spent at Malta and Beirut. He worked in the editorial dept. of the Church Missionary Society at Malta, and in 1841 entered that Society's institution at Islington and became a priest. On account of his knowledge of the Eastern languages, he was sent out as delegate to the Eastern churches (1842–4 and 1850); gov. chaplain at Bombay, 1845; chaplain at Aden, 1846. He joined a Persian expedition under Sir James Outram, 1854–7. He was created D.C.L. by the Archbishop of Canterbury in 1873. Author of *The Nestorians and their Rituals*, 2 vols., 1852; *An English Arabic Lexicon*, 1881.

Badger-baiting, *see* BADGER.

END OF VOL. I